DINOSAURS!

•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•

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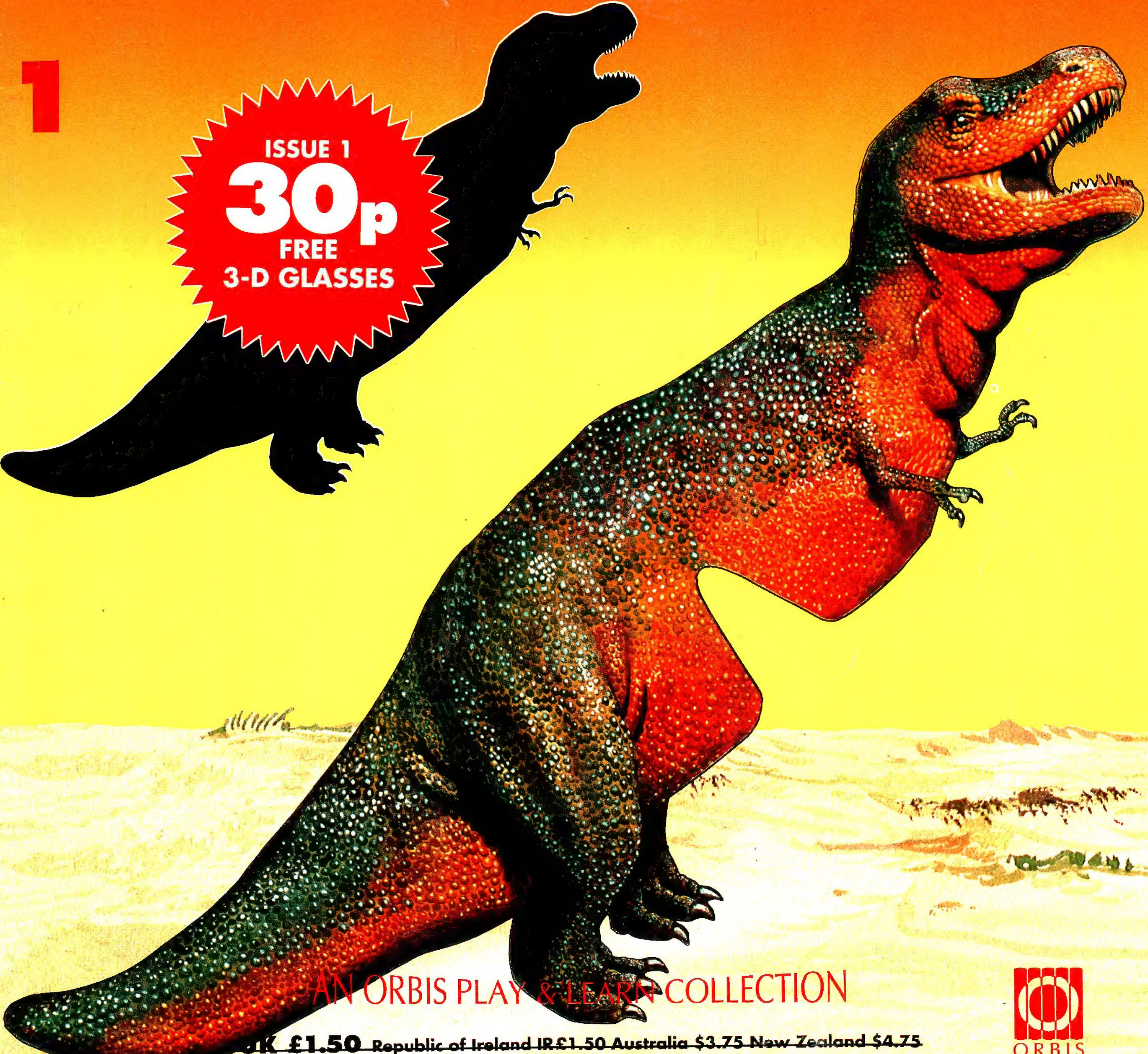

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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

IDENTIKIT

Your guide to the most popular dinosaurs

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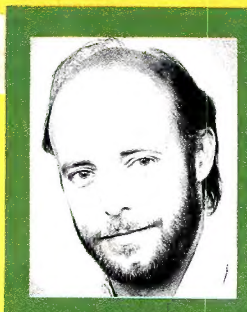

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Dr David Norman is Director of the Sedgwick Museum of Geology at the University of Cambridge. He has written several highly successful books on dinosaurs and acted as consultant to the Granada TV series 'Dinosaur!'

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An introduction to the DINOSAURS! series

Packed with facts

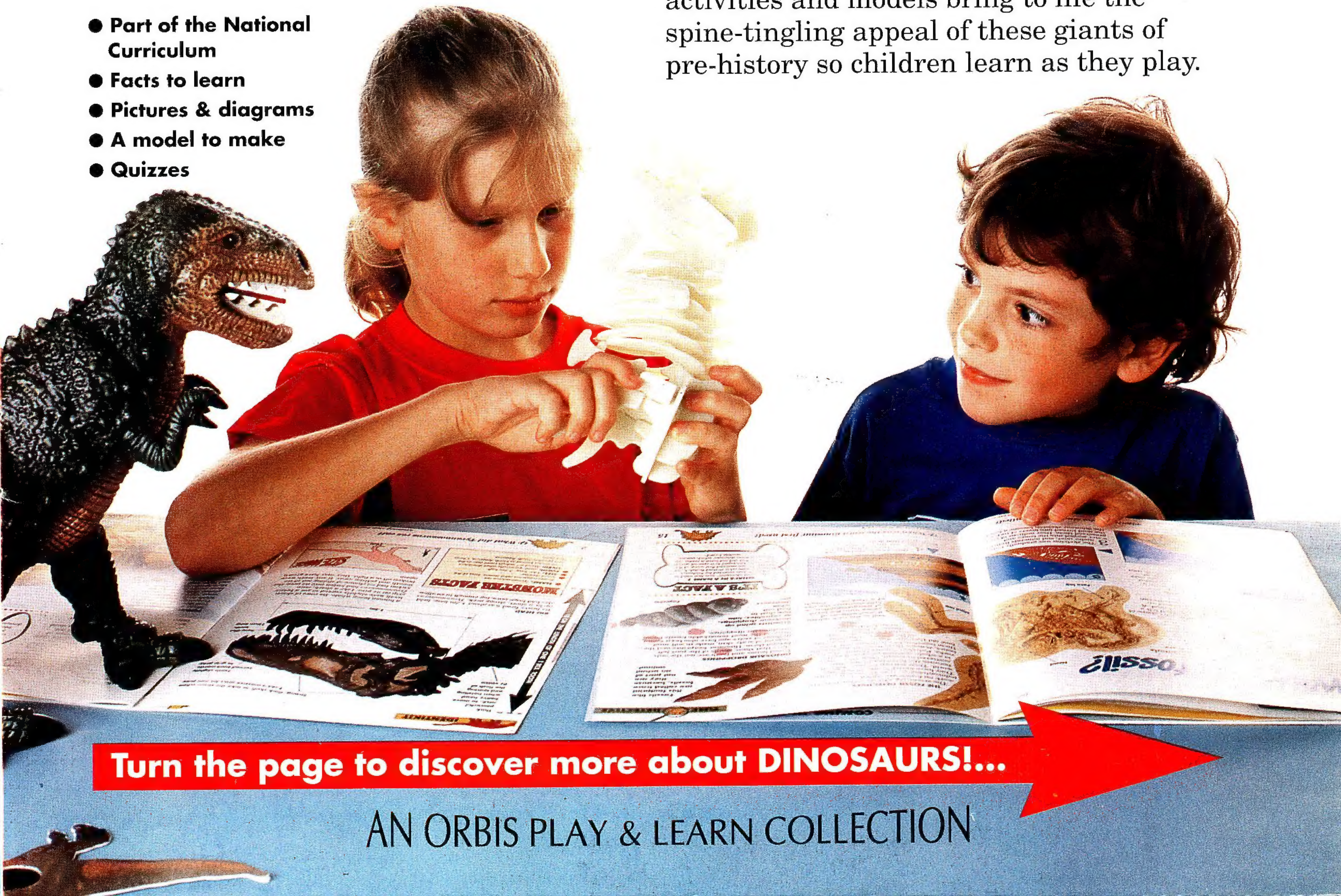
For home, for school, for fun – the ideal reference work

DINOSAURS! is a brand new educational series that unlocks the door to an era when these amazing creatures ruled the world. It transports children back in time to the world as it existed millions of years ago, and explains many aspects of the prehistoric world.

DINOSAURS! is ideal both for school projects and for learning at home. The easy-to-understand text and detailed full-colour illustrations paint a fascinating picture of the lives of the dinosaurs – their appearance, their behaviour and their environment. Designed for learning, the clearly laid out pages combine essential information with surprising new facts to answer all your children's dinosaur questions.

Issue by issue, the series builds into an invaluable reference work. But it's more than just an encyclopedia. The activities and models bring to life the spine-tingling appeal of these giants of pre-history so children learn as they play.

- **Part of the National Curriculum**
- **Facts to learn**
- **Pictures & diagrams**
- **A model to make**
- **Quizzes**



Turn the page to discover more about DINOSAURS!...

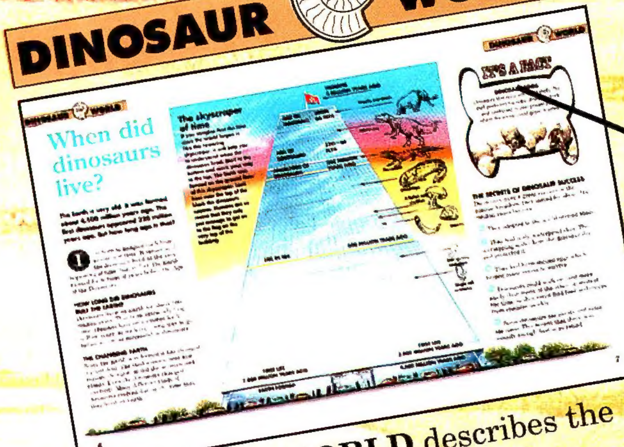
AN ORBIS PLAY & LEARN COLLECTION

How DINOSAURS! works

DINO Fact File

DINO FACTFILE features incredible dinosaur facts and a fun dinosaur quiz to test your children's knowledge.

DINOSAUR WORLD

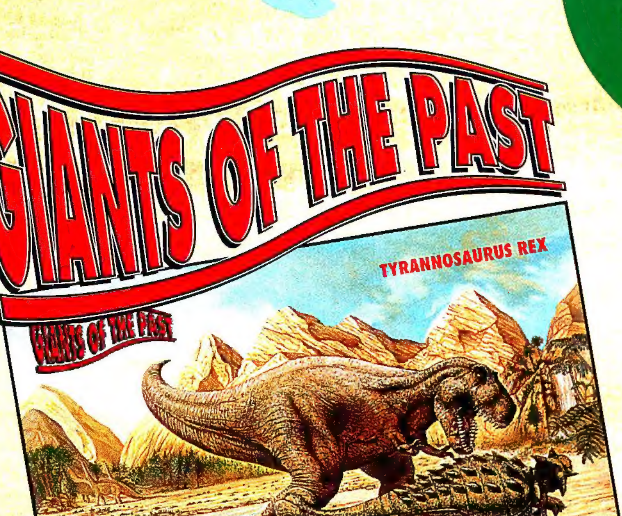


DINOSAUR WORLD describes the Earth as it was in the Age of the Dinosaurs, from habitat and climate to the other creatures.

PLUS

Dinosaurs brought to life in spectacular 3D

GIANTS OF THE PAST



GIANTS OF THE PAST shows the most popular dinosaurs in dramatic full-colour action.

TIME DETECTIVE

TIME DETECTIVE lets children become dinosaur experts and solve some of the great mysteries of time.

DID YOU KNOW...

- *T rex's* jaws were so big that it could have swallowed a human being whole.

Each issue is divided into clearly labelled sections so children can easily find the information they need.

DINOSAURS! ALSO INCLUDES FIVE REGULAR FEATURES:

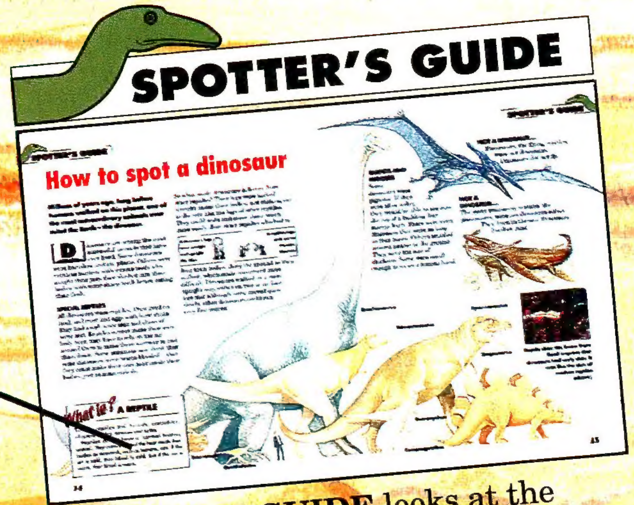
IT'S A FACT lists strange but true dinosaur facts

WHAT IS? explains complicated words and phrases

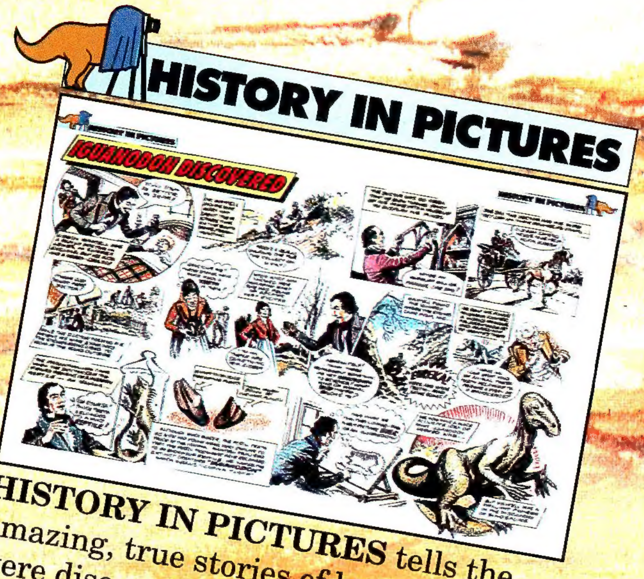
IS IT TRUE? gives theories, interesting stories and controversies

MONSTER FACTS provides details of individual dinosaurs, including name, what it means, size, pronunciation, where and when it lived and the food it ate

SIZE WISE compares each dinosaur in size with modern humans

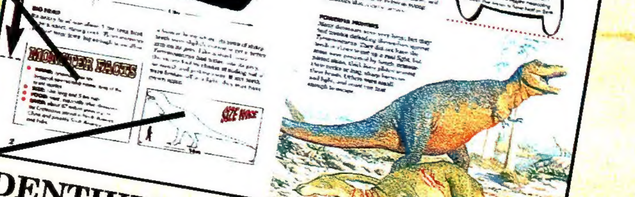


SPOTTER'S GUIDE looks at the features of individual dinosaurs and answers questions such as why some dinosaurs had long necks and why others had armoured bodies.



HISTORY IN PICTURES tells the amazing, true stories of how dinosaurs were discovered and the personalities behind the discoveries.

PLUS
A-Z of the most important dinosaurs



IDENTIKIT profiles all the best-known dinosaurs with information on how they lived and full-colour pictures to show what they looked like.

ASK THE EXPERT A leading palaeontologist answers questions.

- Dinosaur means 'terrible lizard'.
- There were over 1,000 types of dinosaur.

Build your own *Tyrannosaurus rex*

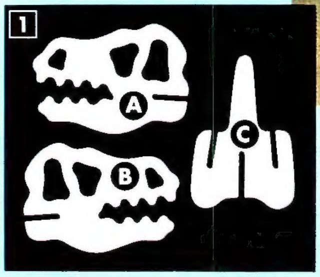
Take home your very own prehistoric giant with this superb *T rex* model. It's easy to put together, and all the pieces you need to complete it come with the first 18 issues of DINOSAURS!

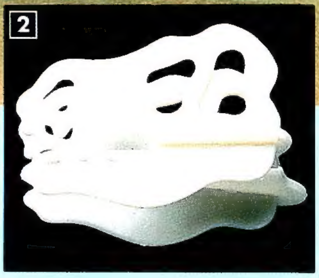
Issues 1-8 come with the parts of the dinosaur skeleton. They build into a sturdy model, which glows in the dark and is perfect to display on its own.

Issues 9-18 come with the parts of the body, which can be painted any colour to bring this gigantic creature to life.

HOW TO ASSEMBLE YOUR MODEL

Issue 1: The Skull
Slot the sides of the head (A and B) into the top slits of C.





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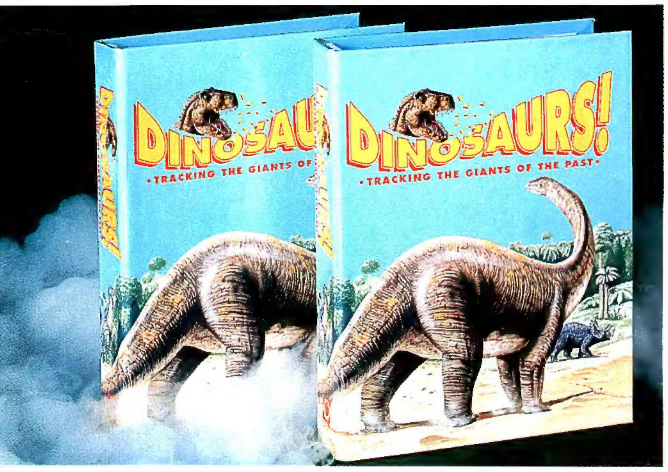

They've been designed to look good at home or at school, and have a specially commissioned *Apatosaurus* illustration by Tony Gibbons, one of Britain's leading dinosaur artists. Each binder is sturdy and hardwearing – it even has a wipe-clean cover – and holds 13 issues.
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Look out for details on how to order your DINOSAURS! binders in future issues.

DID YOU KNOW...

- **Scorpions lived on Earth at least 160 million years before dinosaurs.**

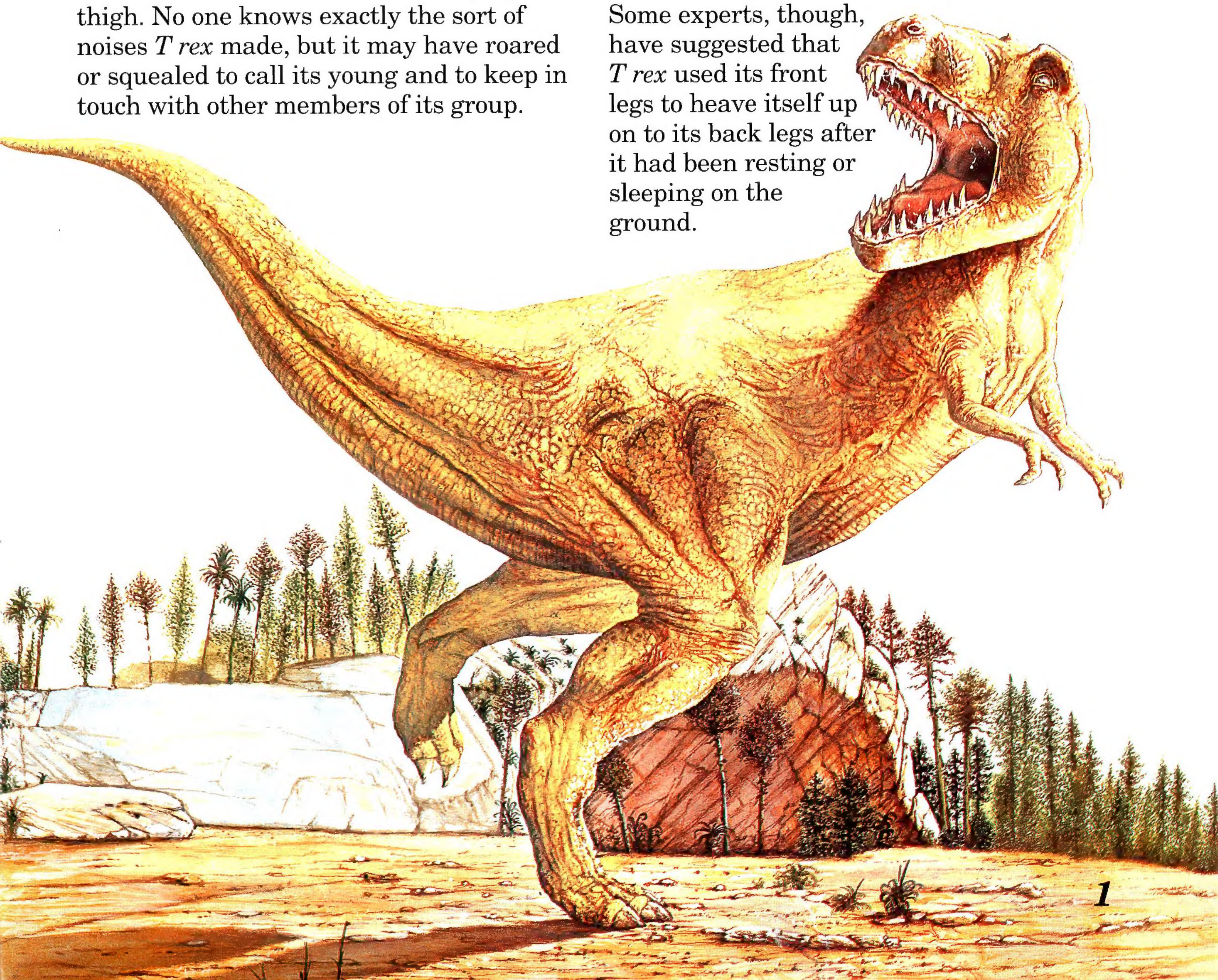
TYRANNOSAURUS REX

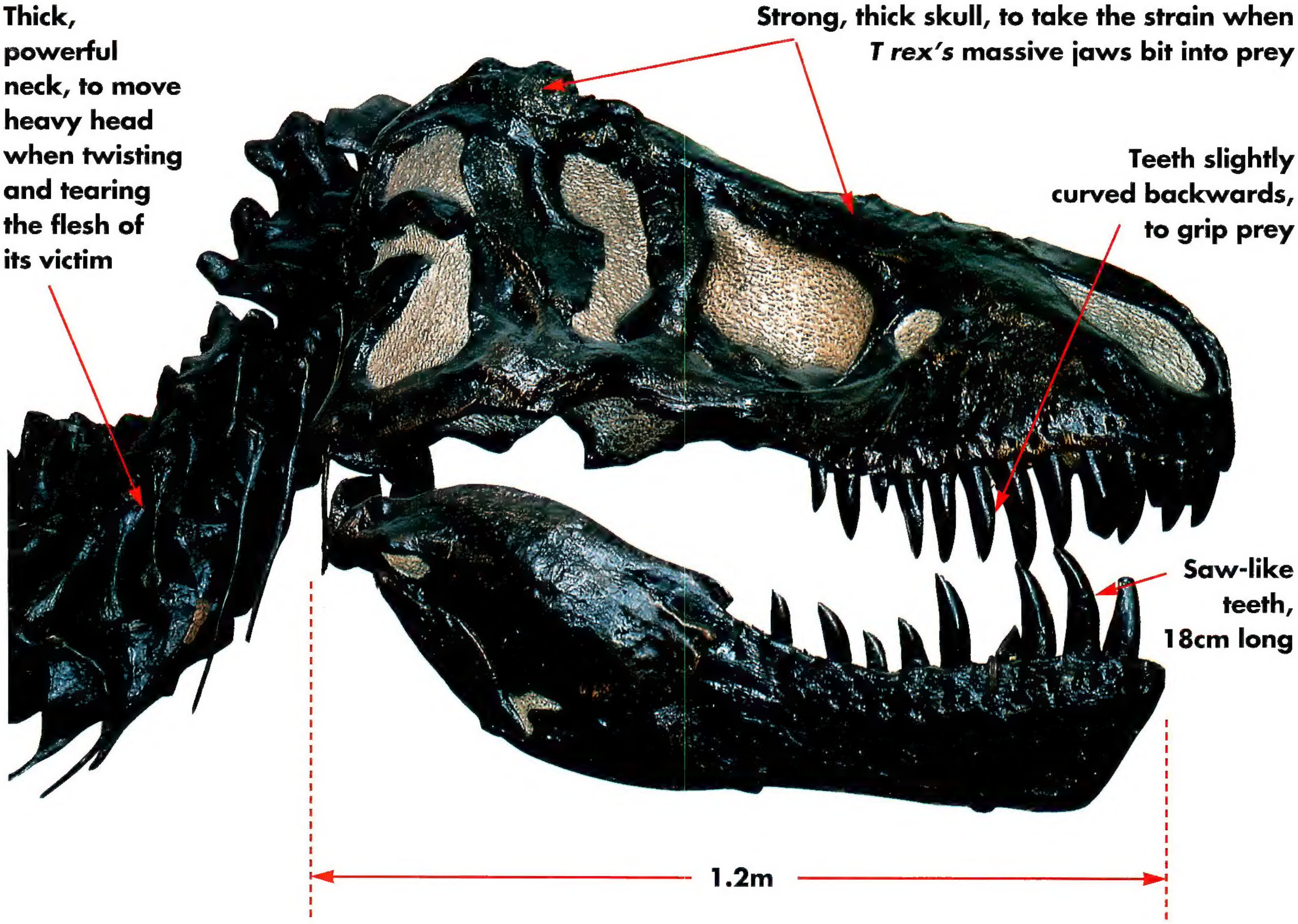
Tyrannosaurus rex was the biggest meat-eating dinosaur that ever lived on Earth and was probably one of the fiercest.

T rex was about as long as four cars, as tall as the tallest giraffe, and weighed about the same as an African elephant. The head of a tall man would have come half way up its thigh. No one knows exactly the sort of noises *T rex* made, but it may have roared or squealed to call its young and to keep in touch with other members of its group.

HUGE FEET

Each of its back feet would have covered four of these pages and had three long claws at the front and one at the back. Its front legs were quite small and high up on its body. They ended in what looked like small 'hands' with two thin, clawed fingers. No one knows for certain what these front legs were used for, but they may have been used to grip prey. They were not even long enough to reach its mouth to push food in. Some experts, though, have suggested that *T rex* used its front legs to heave itself up on to its back legs after it had been resting or sleeping on the ground.




Thick, powerful neck, to move heavy head when twisting and tearing the flesh of its victim

Strong, thick skull, to take the strain when *T rex's* massive jaws bit into prey

Teeth slightly curved backwards, to grip prey

Saw-like teeth, 18cm long

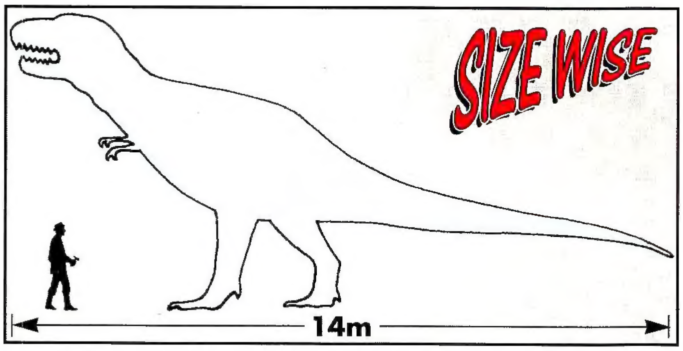
18 CM THE LENGTH OF ONE T REX TOOTH

BIG HEAD

Its heavy head was about 1.2m long, held up by a short, strong neck. *Tyrannosaurus* also had huge jaws, big enough to swallow a human being whole. Its rows of sharp teeth were slightly curved to get a better grip on its prey. Like a shark, once *Tyrannosaurus* had bitten into its prey, the victim had no chance of sliding out of its mouth and getting away. If any teeth were broken off in a fight, they may have grown again.

MONSTER FACTS

- **NAME:** *Tyrannosaurus rex* (ty-ran-oh-saw-rus-reks) means 'king of the tyrant reptiles'
- **SIZE:** 14m long and 5.6m high
- **FOOD:** meat, especially other dinosaurs
- **LIVED:** about 67 million years ago in the Cretaceous Period in North America, China and possibly South America and India



WALKING TALL

Walking upright on its powerful back legs, *Tyrannosaurus* balanced its huge body with its long, thick tail. With its enormous legs, it could run very fast, but it was probably too big and heavy to move quickly for a long time, like hunting dogs do today. Instead, *T rex* may have relied on ambushing its prey in the thick trees and ferns. Some experts think that *Tyrannosaurus* may have hunted in packs, surrounding other dinosaurs, such as a herd of plant-eating *Triceratops* or *Edmontosaurus*, so that they could not escape. Scientists think that it may also have eaten carrion (dead dinosaurs), and perhaps any dying or helpless young dinosaurs that it came across.

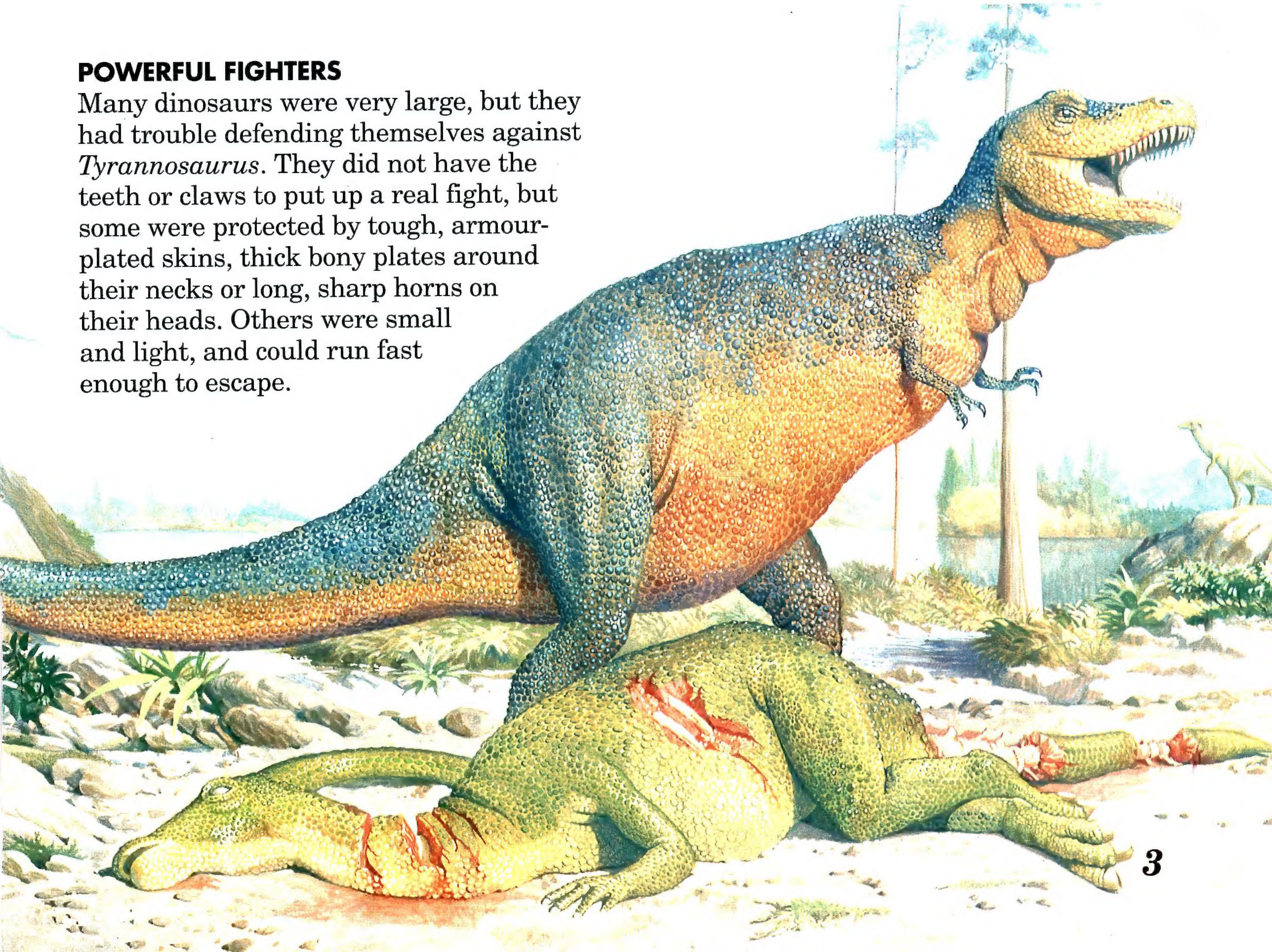
IT'S A FACT

T REX DISCOVERED

In 1902, part of a huge skeleton was uncovered in Montana, USA. Later, another was found in Wyoming, also in the USA. From these bones the American palaeontologist Henry Fairfield Osborn drew up the first picture of this giant creature. He named it *Tyrannosaurus rex* (meaning 'king of the tyrant reptiles') because it was the biggest meat-eating dinosaur then known to have lived on Earth.

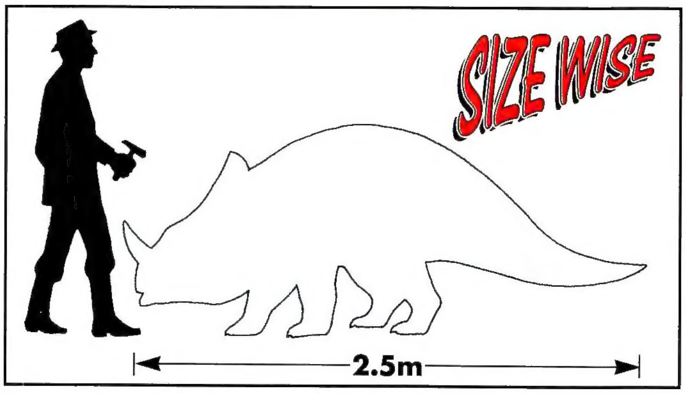
POWERFUL FIGHTERS

Many dinosaurs were very large, but they had trouble defending themselves against *Tyrannosaurus*. They did not have the teeth or claws to put up a real fight, but some were protected by tough, armour-plated skins, thick bony plates around their necks or long, sharp horns on their heads. Others were small and light, and could run fast enough to escape.



AVACERATOPS

Avaceratops was about as long as a mini car and sturdily built, like a miniature tank.



This dinosaur had a bony frill, like a collar, around its neck and a short horn on its nose. The horn was probably used to protect it from much larger meat-eating dinosaurs.

BEAK LIKE A PARROT

Avaceratops was a plant-eater. It chopped off the stems with its special mouth, which was rather like a parrot's beak. *Avaceratops* then sliced up the woody parts of the plants with rows of sharp teeth at the back of its jaws.

STRONG LEGS

It is possible that *Avaceratops* could run quite fast on its four well-muscled legs. As it ran, it balanced itself with its heavy tail which it held off the ground.

JUST ONE SKELETON

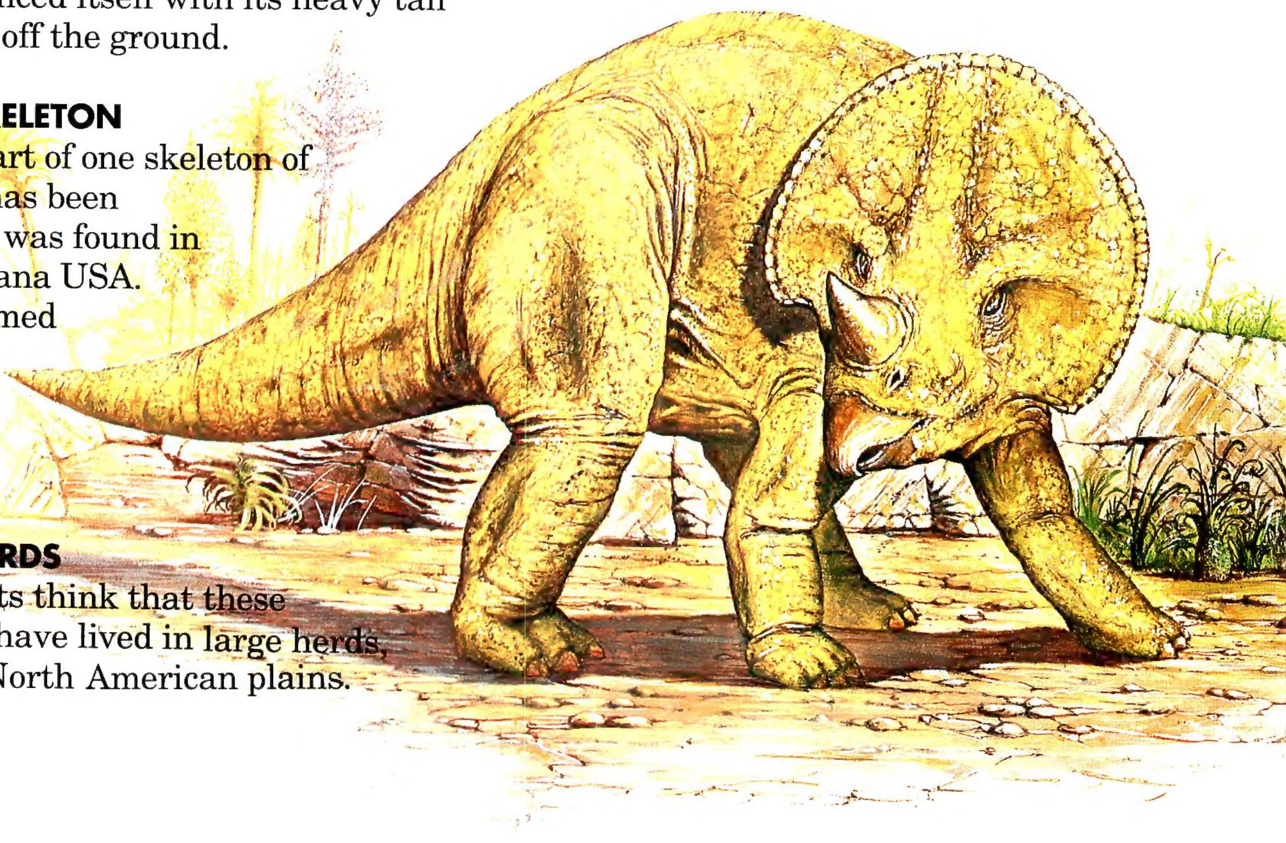
So far, only part of one skeleton of *Avaceratops* has been discovered. It was found in 1981 in Montana USA. It was not named until 1988.

LIVING IN HERDS

Some scientists think that these animals may have lived in large herds, roaming the North American plains.

MONSTER FACTS

- **NAME:** *Avaceratops* (a-va-serra-tops), 'ceratops' means 'horned face'
- **SIZE:** about 2.5m long and 1m high
- **FOOD:** low-growing plants
- **LIVED:** between about 100 – 66 million years ago in the late Cretaceous Period, in North America



DICRAEOSAURUS

***Dicraeosaurus* was a peaceful plant-eater as big as a medium-sized truck.**

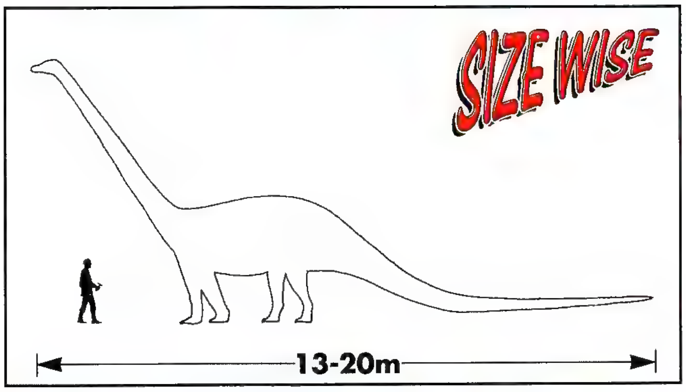
Deep in the thick forests of tree-ferns, conifers (trees that have cones) and palms, *Dicraeosaurus* wandered about eating plants and seeds. This tall dinosaur had a long thin neck, a thin, whippy tail and long, pencil-like teeth at the front of its jaws.

SMALL HEAD

Dicraeosaurus had a small head for its size. Its eyes and nostrils were also small. As a plant-eater, it must have been attacked by the large meat-eating dinosaurs. It had no armour or sharp claws to defend itself, but it may have used its tail as a whip lash. Scientists think *Dicraeosaurus* may also have been able to move fast enough to run away from its enemies when threatened by them.

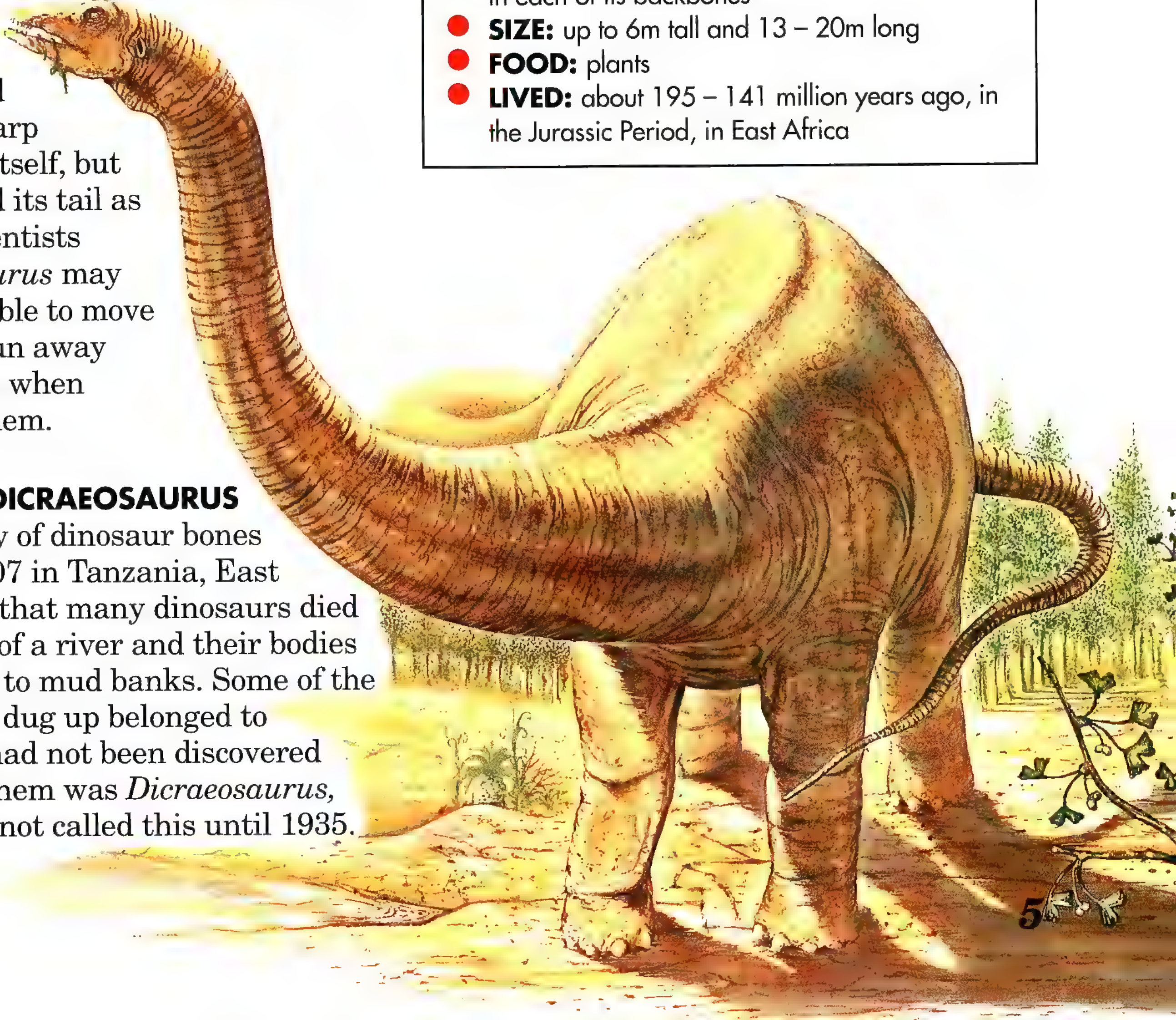
DISCOVERING DICRAEOSAURUS

A huge discovery of dinosaur bones was made in 1907 in Tanzania, East Africa. It seems that many dinosaurs died near the mouth of a river and their bodies were washed on to mud banks. Some of the bones that were dug up belonged to dinosaurs that had not been discovered before. Among them was *Dicraeosaurus*, although it was not called this until 1935.



MONSTER FACTS

- **NAME:** *Dicraeosaurus* (die-cray-oh-saw-rus), called 'forked lizard' because of the forked spines in each of its backbones
- **SIZE:** up to 6m tall and 13 – 20m long
- **FOOD:** plants
- **LIVED:** about 195 – 141 million years ago, in the Jurassic Period, in East Africa



When did dinosaurs live?

The Earth is very old. It was formed about 4,500 million years ago. The first dinosaurs appeared 220 million years ago. But how long ago is that?

It is hard to imagine such huge amounts of time. It seems as if the dinosaurs lived at the very beginning of time, but, in fact, the Earth existed for billions of years before the Age of the Dinosaurs.

HOW LONG DID DINOSAURS RULE THE EARTH?

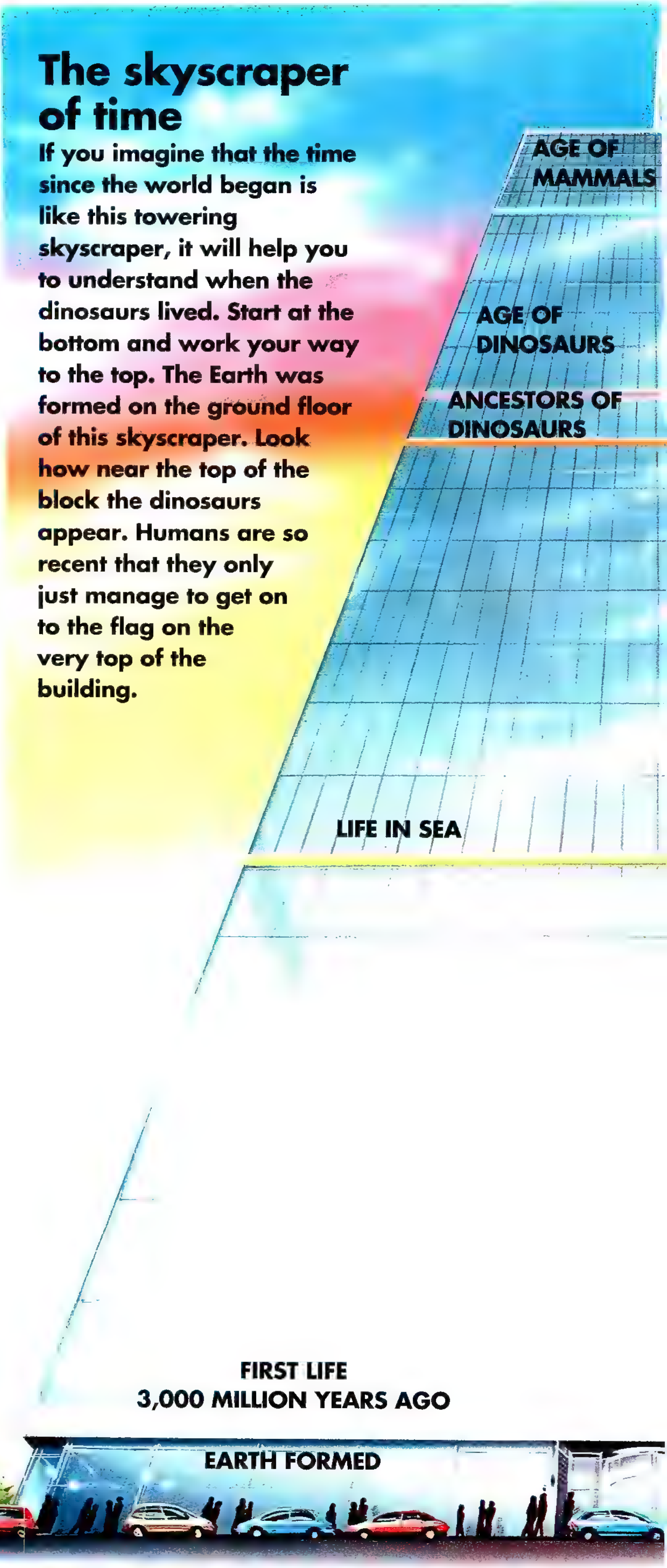
Dinosaurs lived on Earth for about 160 million years. That is an extremely long time. Humans have only existed for 3 million years, so we have a long way to go before we are as successful as dinosaurs.

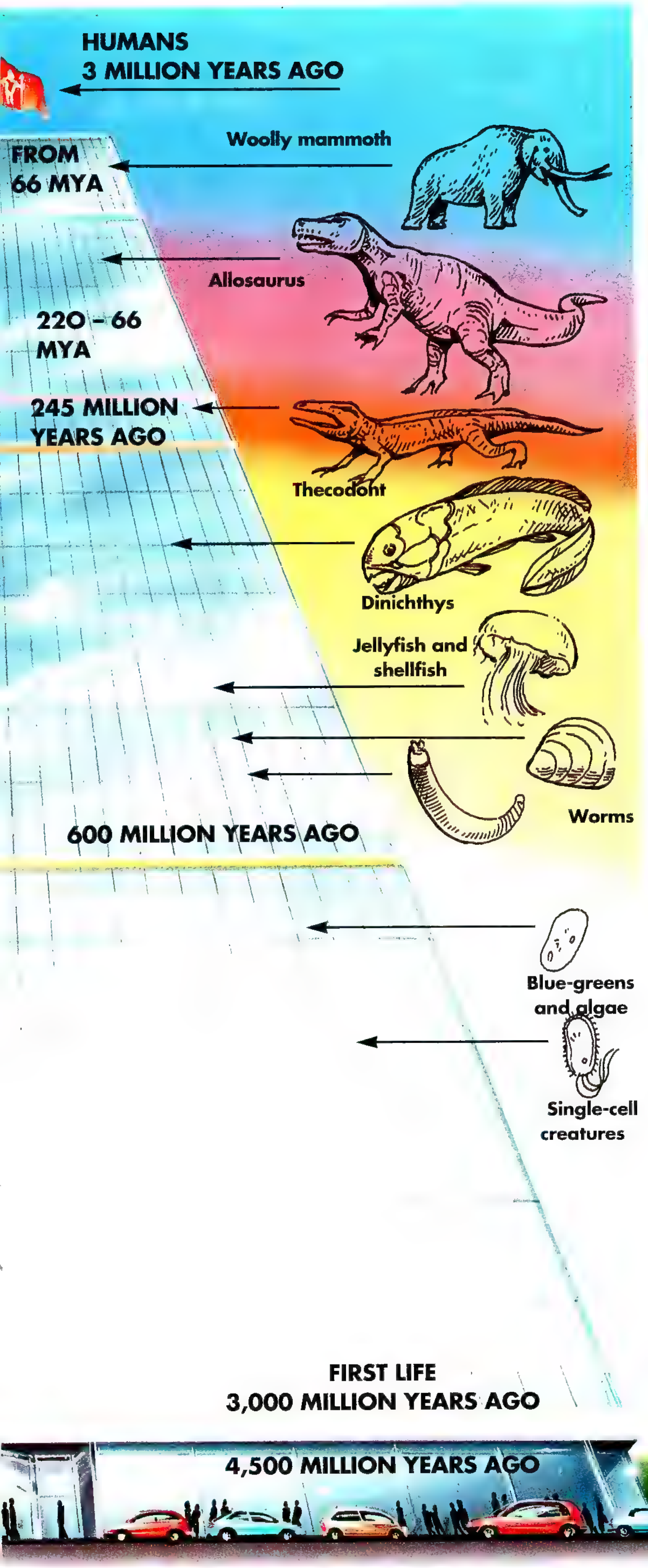
THE CHANGING EARTH

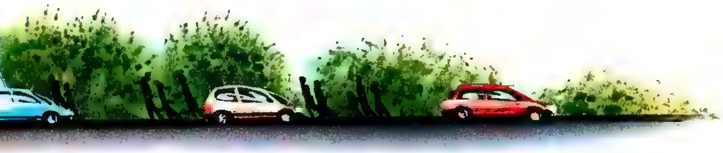
Since the Earth was formed it has changed a great deal. The land masses, seas and climate changed, so did the animals and plants. Even the dinosaurs changed (evolved). Many different kinds of dinosaurs evolved during the time that they lived on Earth.

The skyscraper of time

If you imagine that the time since the world began is like this towering skyscraper, it will help you to understand when the dinosaurs lived. Start at the bottom and work your way to the top. The Earth was formed on the ground floor of this skyscraper. Look how near the top of the block the dinosaurs appear. Humans are so recent that they only just manage to get on to the flag on the very top of the building.



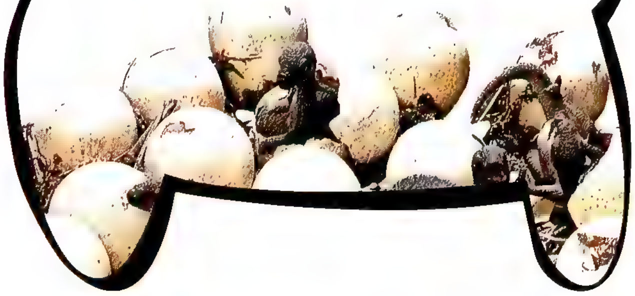




IT'S A FACT

DINOSAUR EGGS

Dinosaurs laid eggs with hard shells. The shell protected the baby dinosaur inside and contained its own private pond where the young could grow in safety.



THE SECRETS OF DINOSAUR SUCCESS

Dinosaurs were a great success of the animal kingdom, they lasted for about 160 million years because:

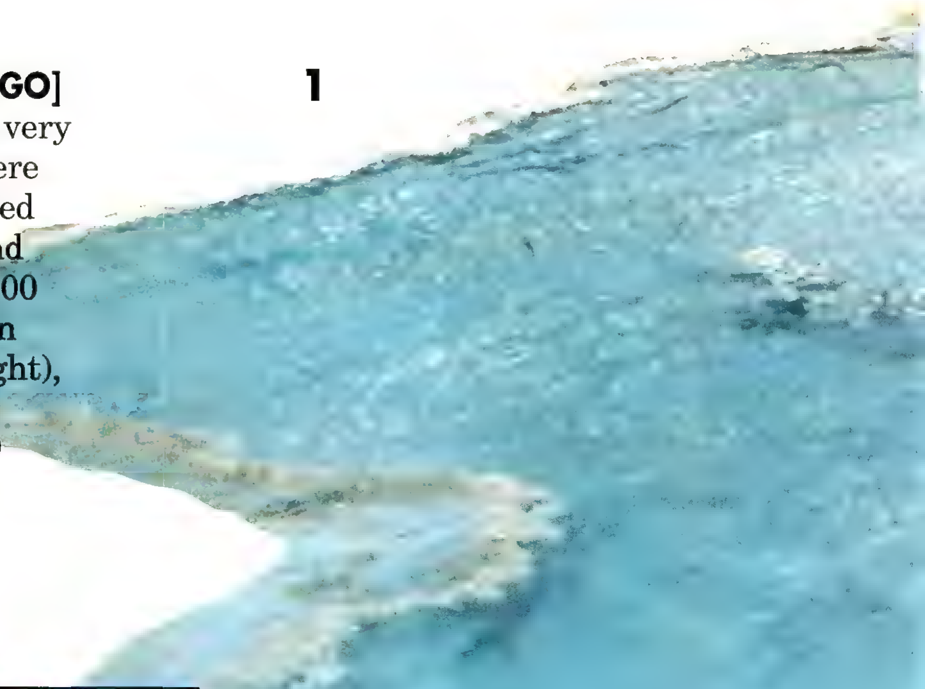
- They adapted to the world around them.
- They had scaly, waterproof skin. The overlapping scales kept the dinosaur dry and protected it.
- They laid hard-shelled eggs which helped many young to survive.
- Dinosaurs could walk on land more easily than many of the other animals of the time, so they could find food and escape from enemies quickly.
- Some dinosaurs ate plants and some ate meat. This meant that there was usually enough food to go round.

Life before dinosaurs

Dinosaurs were not the first living things. Life began billions of years before them with the simplest living thing – the single cell. Gradually animals with many cells, such as reptiles and mammals, evolved.

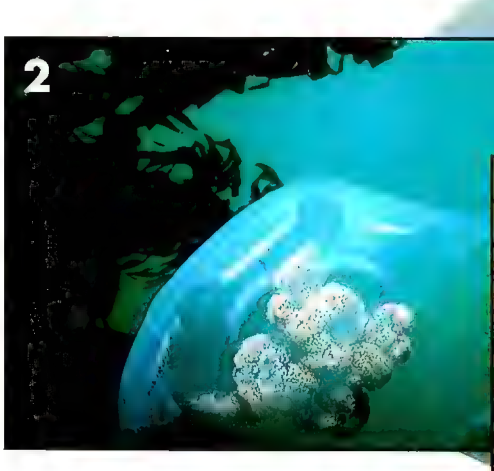
1 FIRST LIFE
3,000 MYA [MILLION YEARS AGO]

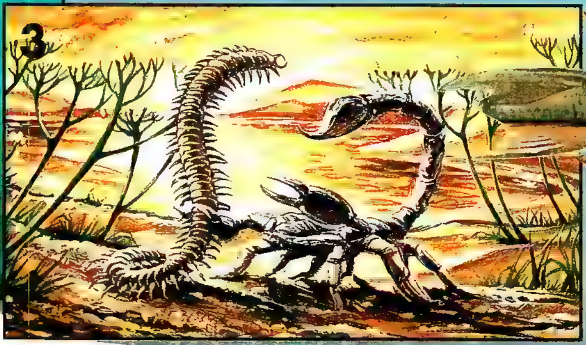
The first living things on Earth were very simple, single-celled forms of life. There were bacteria and a type of algae called blue-greens. Fossils of blue-greens and bacteria have been found in rocks 3,000 million years old. These hot springs in Yellowstone Park, North America (right), contain bacteria and simple algae. Perhaps this scene is similar to 3,000 million years ago when life began.

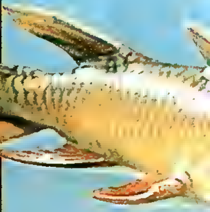


2 LIFE IN THE SEA
600 – 530 MYA

Before fish, the seas were home to other creatures. Many of them were like sea animals that live today. There were jellyfish, shellfish called brachiopods and many sorts of sea worms. One type of animal that hasn't survived is the trilobite. Trilobites were sea creatures with hard bodies like armour, which were jointed so that they could move. They had legs like those of shrimps. To protect themselves some could curl up into a ball, rather like a woodlouse.







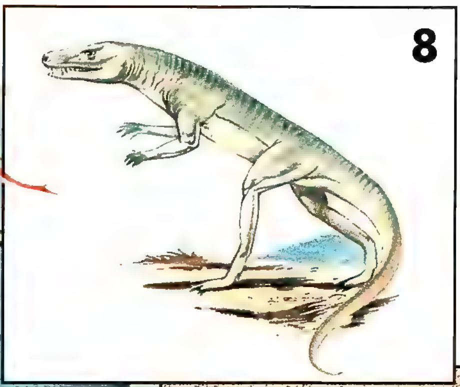
3 LEAFLESS PLANTS & INSECTS
410 – 380 MYA

The first plants were leafless and flowerless and no more than 4 or 5cm tall. They lived on boggy ground. Through this miniature jungle, scorpions hunted millipedes that fed on the plants.

9 THE AGE OF THE DINOSAURS BEGINS
220 MYA

8 DINOSAUR ANCESTOR
245 MYA

Archosaur reptiles, some of which were rather like modern crocodiles, were among the animals on Earth. Some, such as *Euparkeria*, may have have been the ancestors of the dinosaurs.

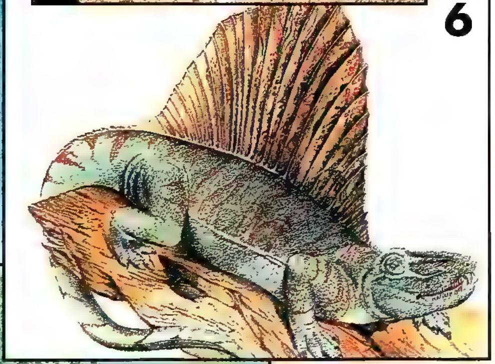


7 FLYING INSECTS, TOWERING FORESTS
300 MYA

Through huge forests flew the first flying insects such as dragonflies. Some of these had vast wingspans up to 70cm across. They were the largest flying insects ever to exist.

6 REPTILES RULE
310 MYA

There were more reptiles on land than amphibians. Scientists think that one group of reptiles were the ancestors of mammals. *Dimetrodon* belonged to this group.



5 AMPHIBIANS RULE
370 – 280 MYA

Amphibians live on land and in water, where they lay their eggs. Amphibians evolved from fish. At this time in history amphibians were very successful. Some amphibians were quite big. *Ichthyostega* was about 1m long. It looked a bit like a fish and had scales and a fin, but it had legs and could walk on land, although it spent most of its time in water.

4 FISH TEEM IN THE SEA
390 MYA

The first animals with backbones were fish. It is thought that sometime during this period *Eusthenopteron,* a fish that used its front fins to help it ‘walk’, crawled out of the water to live on land. It was the ancestor of land animals.

3-D Gallery

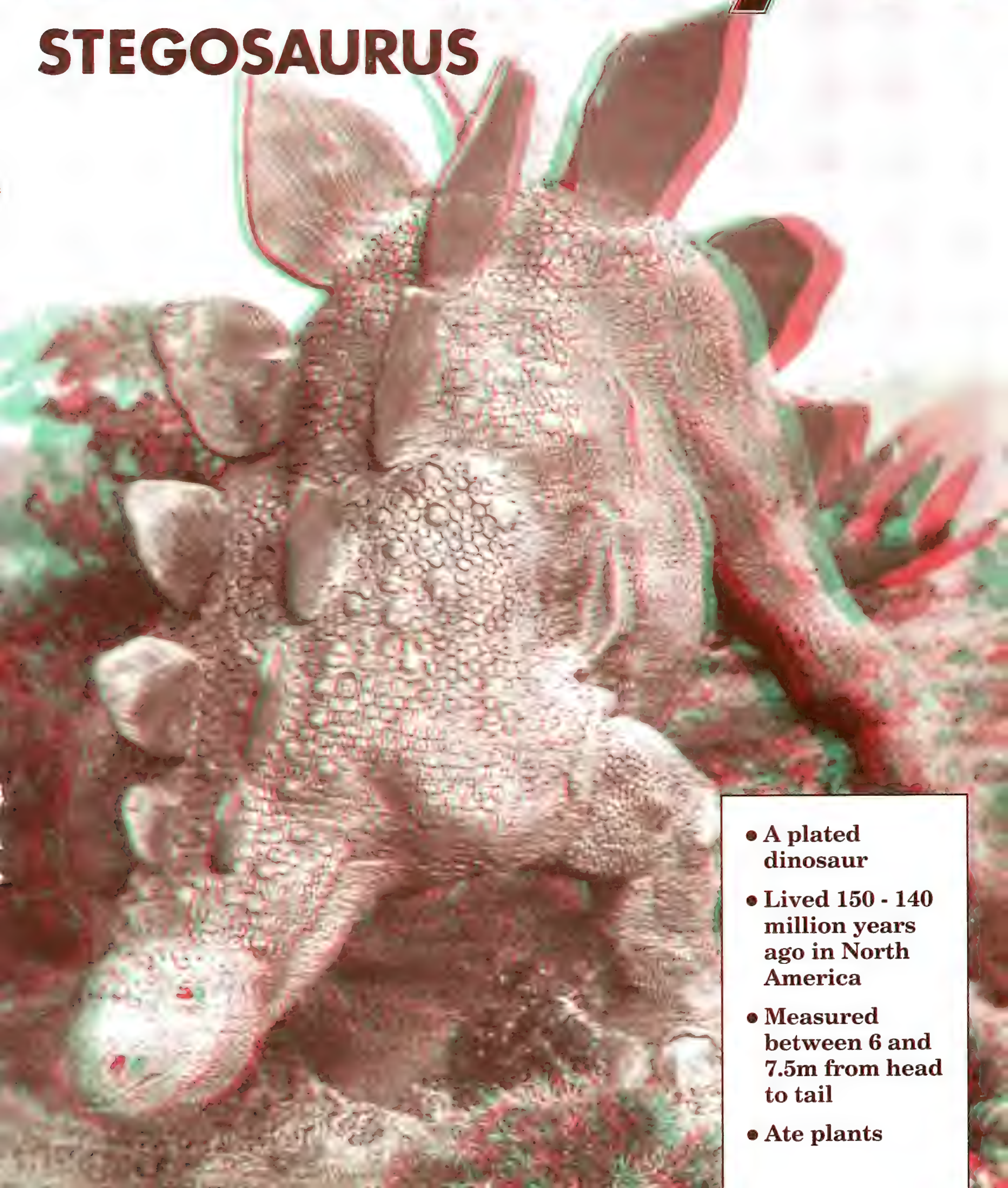
1

CERATOSAURUS

- A horned dinosaur
- Lived 150 - 135 million years ago in North America
- Measured 6m from head to tail
- Ate meat

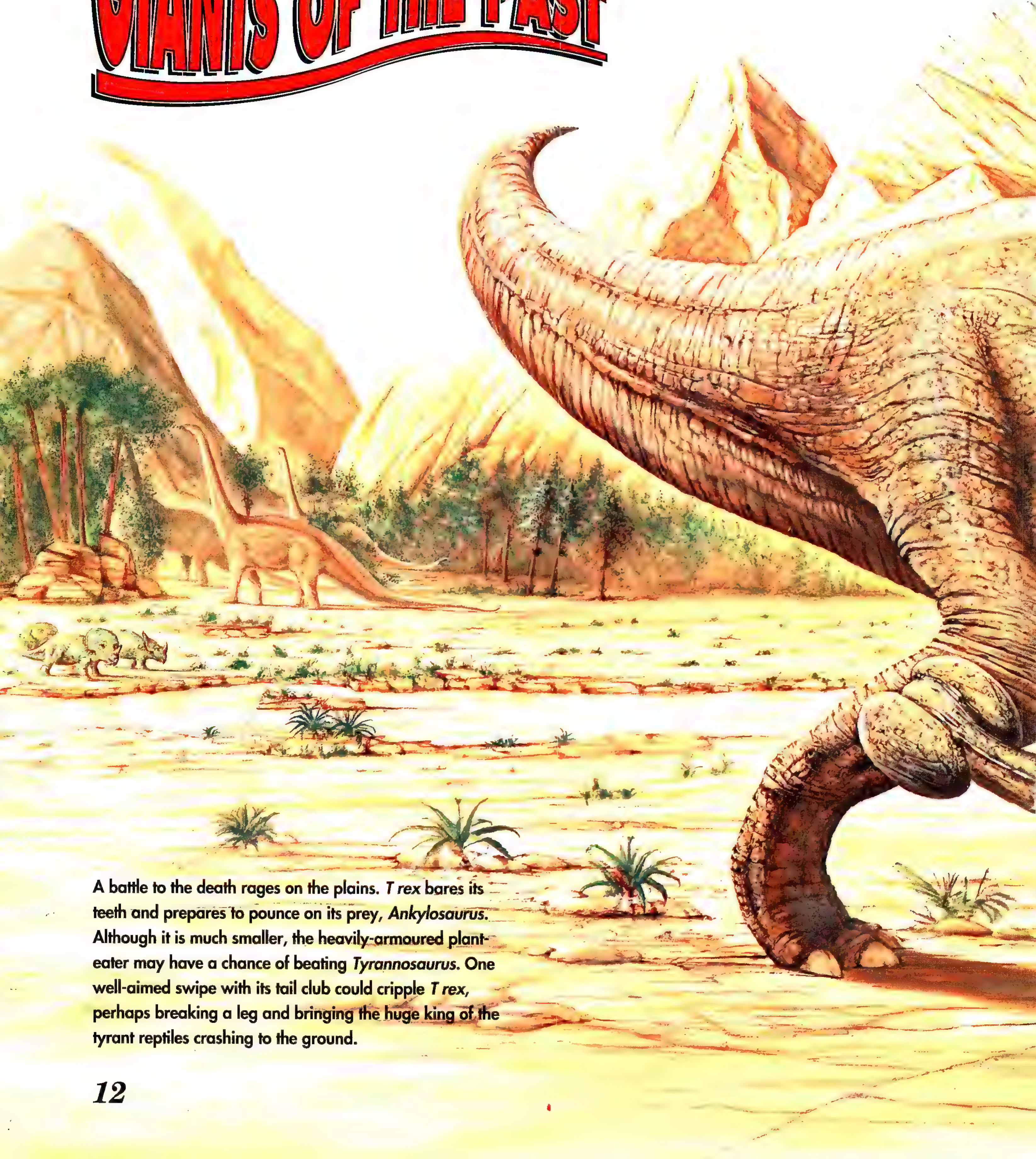
3-D Gallery 2

STEGOSAURUS



- A plated dinosaur
- Lived 150 - 140 million years ago in North America
- Measured between 6 and 7.5m from head to tail
- Ate plants

GIANTS OF THE PAST



A battle to the death rages on the plains. *T rex* bares its teeth and prepares to pounce on its prey, *Ankylosaurus*. Although it is much smaller, the heavily-armoured plant-eater may have a chance of beating *Tyrannosaurus*. One well-aimed swipe with its tail club could cripple *T rex*, perhaps breaking a leg and bringing the huge king of the tyrant reptiles crashing to the ground.

TYRANNOSAURUS REX

How to spot a dinosaur

Millions of years ago, long before humans walked on this planet, one of the most extraordinary animals ever ruled the Earth – the dinosaur.

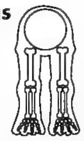
Dinosaurs are among the most successful animals that have ever lived. Some dinosaurs were harmless and ate plants. Others were ruthless hunters with vicious teeth who caught their prey then slashed into their bodies with razor-sharp teeth before eating their flesh.

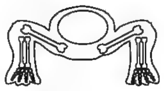
SPECIAL REPTILES

All dinosaurs were reptiles. They lived on land, and most laid eggs with hard shells. They had tough scaly skin and claws of some sort. Reptiles cannot make their own body heat, they have to rely on the air around them to make them warm or to cool them down. Some scientists now think that some dinosaurs were 'warm-blooded' – that they could make their own heat inside their bodies, just as mammals do.

So what made dinosaurs different from other reptiles? Their legs were tucked straight under their bodies, not sticking out to the side like the legs of other reptiles. They could walk and move about much more easily than other reptiles who had to drag their bodies along the ground as they walked, which made movement more difficult. Dinosaurs walked in a more upright way, either on two or on four legs and although some moved quite slowly, other dinosaurs could run very fast indeed.

A dinosaur's legs were straight and upright like this:



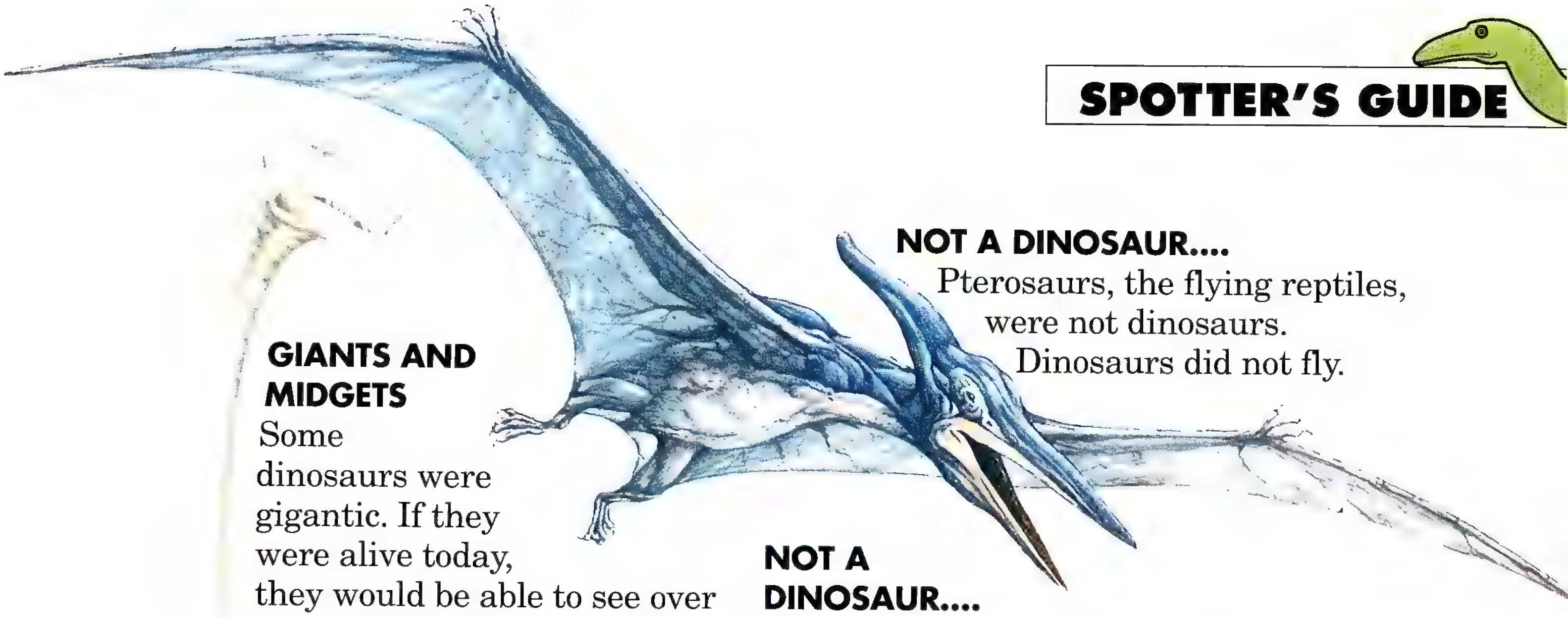


Other reptiles' legs stick out at the side, like this:

What is? A REPTILE

Today's reptiles include lizards, crocodiles, alligators, snakes, tortoises and turtles.

Reptiles do not have a 'central heating system'. They cannot control the heat inside their bodies as mammals, such as humans, can. If the air is cold, their blood is cold, but if the air is warm, their blood is warm.



NOT A DINOSAUR....

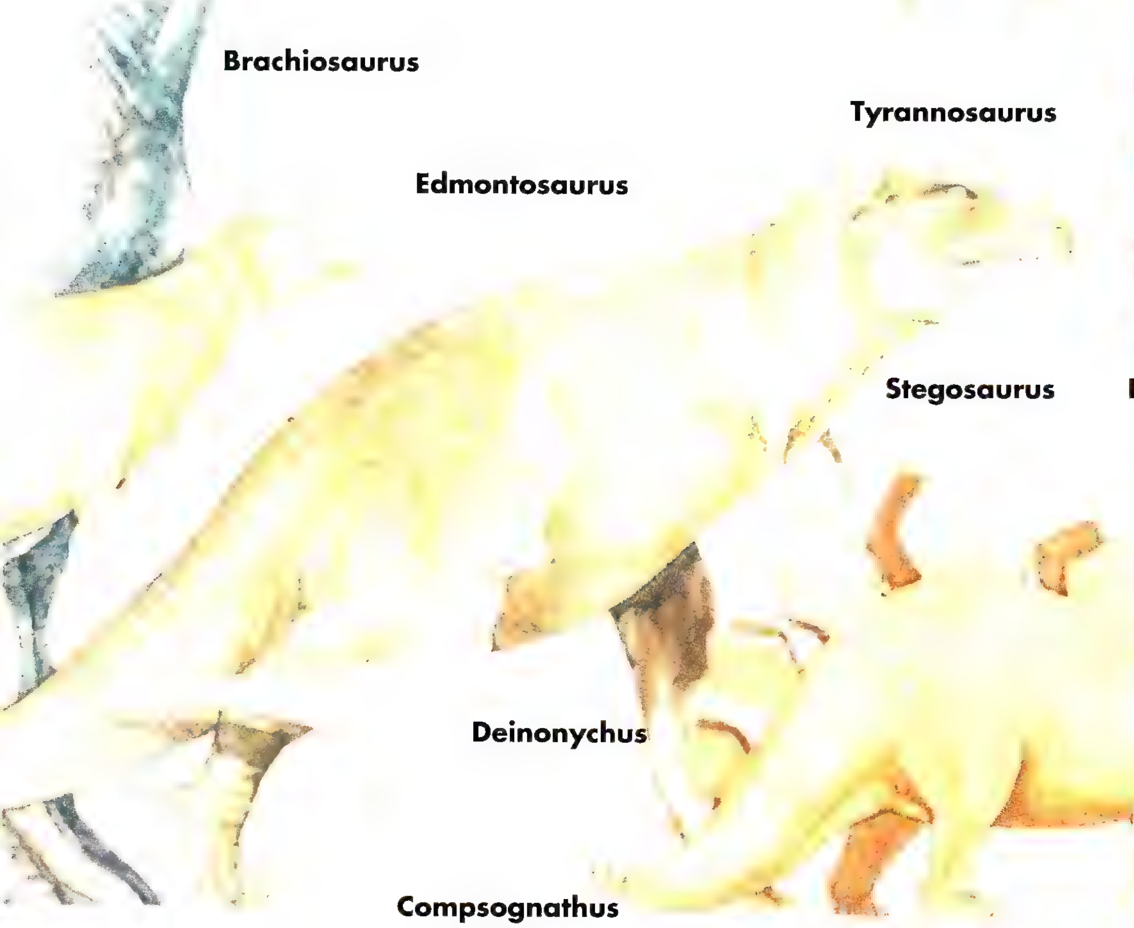
Pterosaurs, the flying reptiles, were not dinosaurs. Dinosaurs did not fly.

GIANTS AND MIDGETS

Some dinosaurs were gigantic. If they were alive today, they would be able to see over the top of a building four storeys high. There were even dinosaurs that were as long as four buses. Others scuttled around nearer to the ground. They were the size of chickens. Some were small enough to sit on a human hand.

NOT A DINOSAUR....

The giant swimming reptiles, the plesiosaurs, were not dinosaurs either. They lived in the sea. Dinosaurs lived on land.



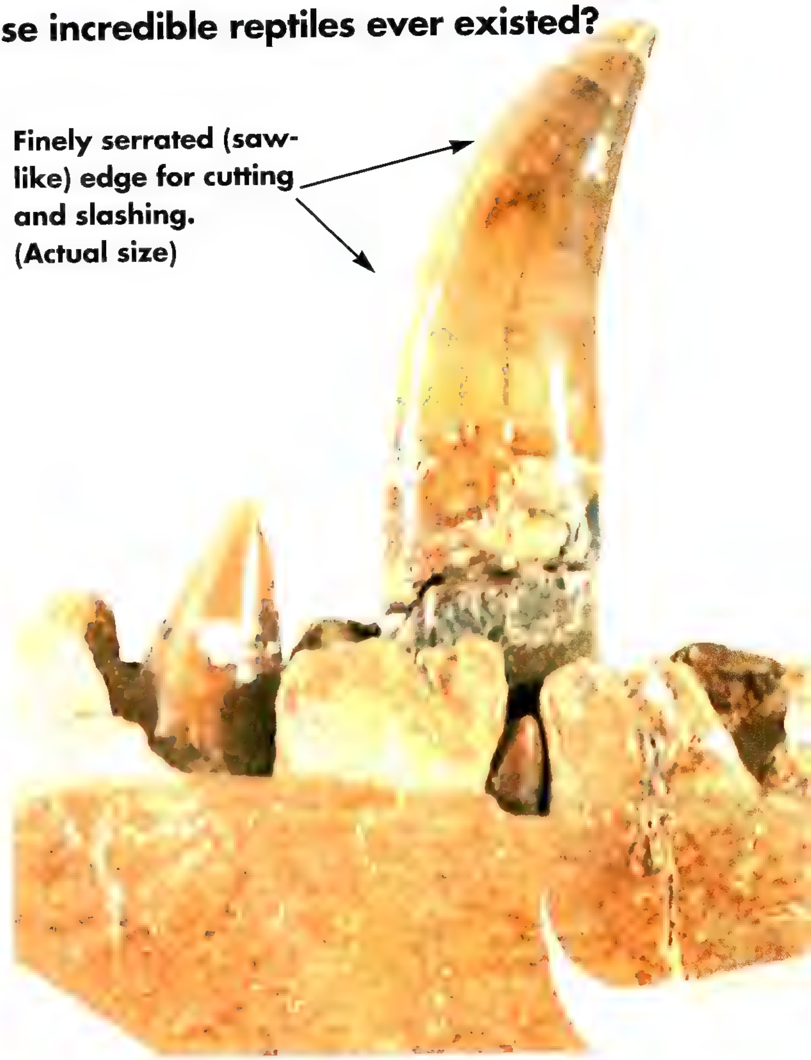
Reptile skin: We know from fossil imprints that dinosaurs had scaly skin. It was like the skin of modern reptiles (above).

The world's biggest detective story

Dinosaurs died out millions of years before the first humans appeared on Earth. So how do we know that these incredible reptiles ever existed?

We know about dinosaurs because about 160 years ago several people who studied rocks and fossils found some clues and began to piece together the evidence, just as detectives do. The first clue they found is on this page. Follow this and the other clues and try your hand at being a dinosaur detective.

CLUE 1 If you found this large, pointed object (right) amongst some rocks what would you think it was? This is its actual size. It is curved, it has a serrated (saw-like) edge, it feels like a piece of rock but it looks more like part of an animal – a claw, or maybe a tooth. Yes, that's what it is, an enormous tooth.



Finely serrated (saw-like) edge for cutting and slashing. (Actual size)

CLUE 2 The tooth is so large that it must have belonged to an enormous animal. The biggest land animal is an elephant. Could it have belonged to an elephant? The answer is no, because this tooth is designed for cutting and tearing flesh – and elephants don't eat meat.

Is it true that a tooth was the first clue to the existence of dinosaurs?

Yes, it is true that the first clue that dinosaurs had existed was a tooth. In 1824 William Buckland, a professor of Geology (the study of rocks), carried out the detective work on a large tooth that was found in a slate quarry in Oxfordshire. It was Buckland who gave the name *Megalosaurus* to the dinosaur that once owned the giant tooth. *Megalosaurus* was the first dinosaur to be named. When the teeth were found, they were still firmly fixed into the animal's jaw-bone.

CLUE 3

Question: What's big and eats meat? Answer: Tigers are the largest meat-eaters. So did the tooth belong to a tiger? Possibly. But wait a bit, here's another clue. This tooth is not the same shape as a tiger's. This tooth is the right shape for cutting and slashing.

A tiger's tooth has a smooth edge and is designed for stabbing. Our tooth didn't belong to a tiger, or a lion. So what did it belong to?

CLUE 4

In fact, this tooth is very like the teeth of meat-eating reptiles. The largest one alive today is the Komodo dragon, a 3m long monitor lizard that lives in Indonesia. Therefore the tooth must have belonged to a meat-eating reptile, but it is too big to belong to a modern lizard. So it must have belonged to a very large reptile, probably at least 9m long.

Megalosaurus

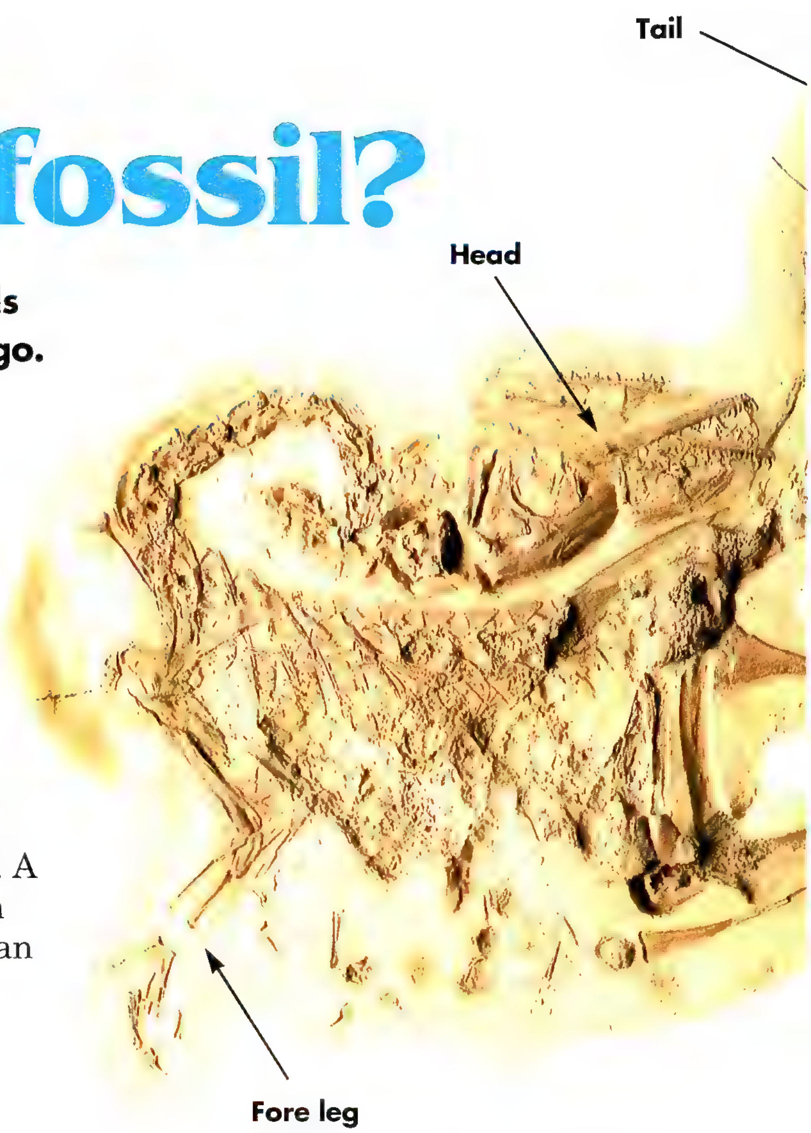
GOT IT!

But no such creature exists today. However, the tooth was found in rocks millions of years old and is, itself, a fossil. So it must have belonged to a huge meat-eating reptile that lived and died millions of years ago. It did. It belonged to a dinosaur called *Megalosaurus,* which means 'giant reptile'.

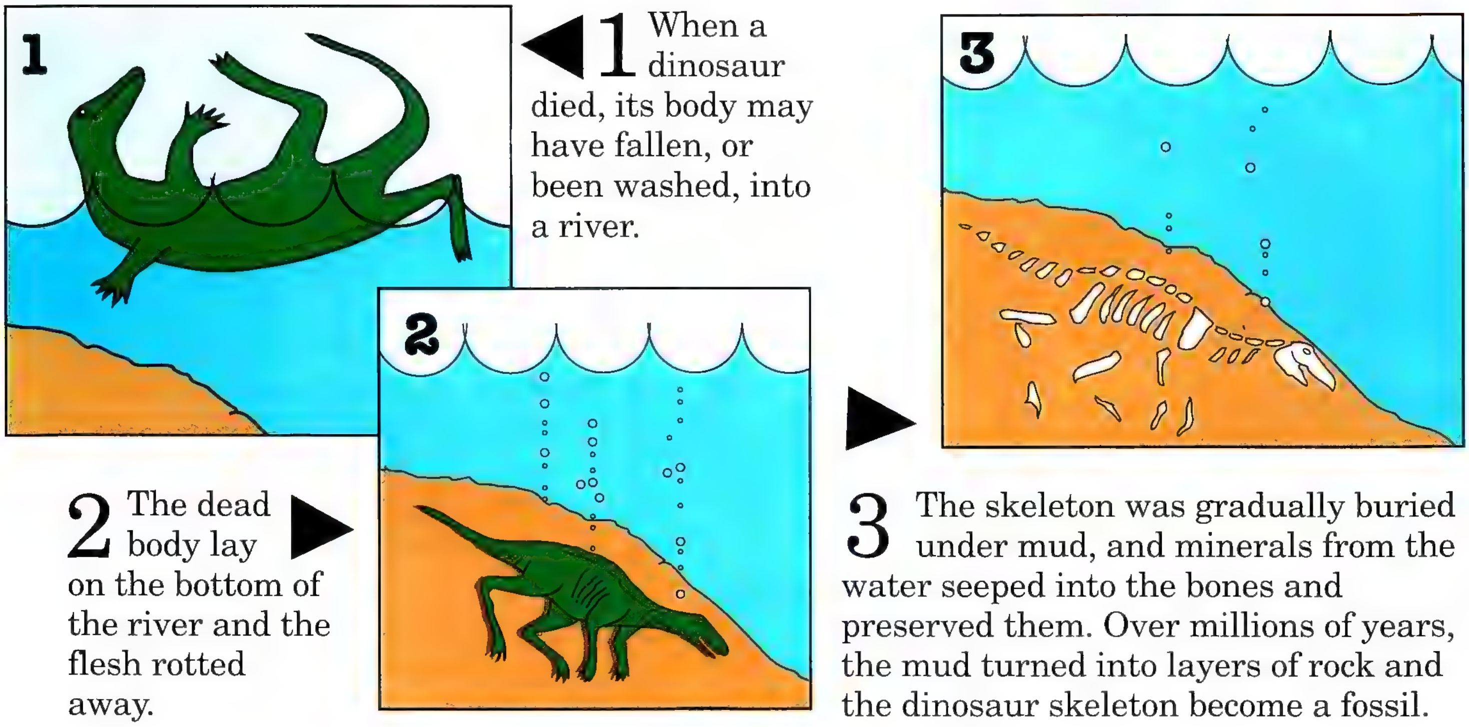
What is a fossil?

Fossils are often the only clues to animals and plants that lived millions of years ago. But how were they made?

Fossils are the remains or prints of animals and plants that have been preserved in rocks. Quite often, only the hard parts of an animal, such as the teeth or bones, are left. The rest has rotted away. But even when nothing remains of an animal, it may have left a hollow, the exact shape of its body, in the rock. Sometimes an animal left a footprint when it walked in soft sand or mud. A single footprint may be all that remains of an animal that was as big as four cars. Fossils can take millions of years to form.



HOW A DINOSAUR BECAME A FOSSIL



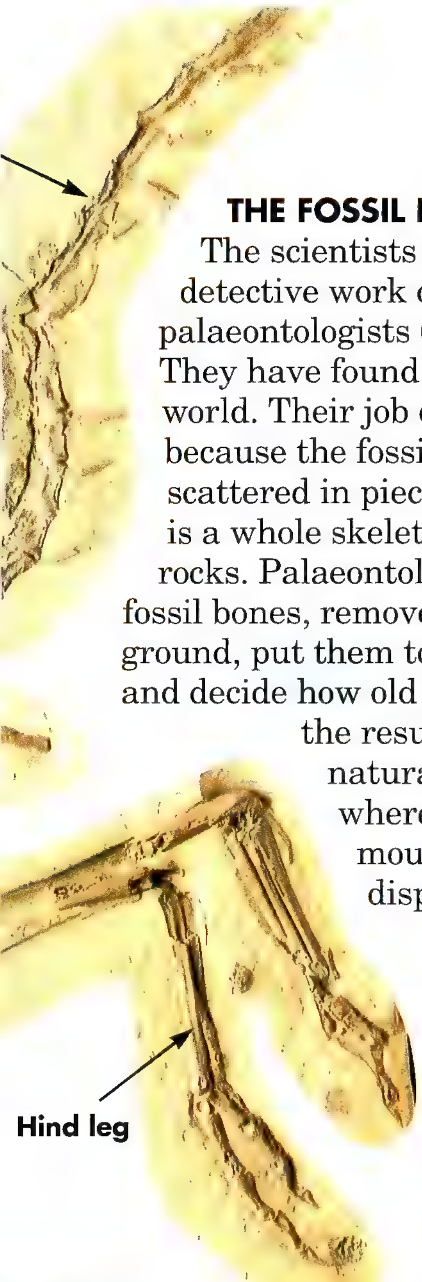
1 When a dinosaur died, its body may have fallen, or been washed, into a river.

2 The dead body lay on the bottom of the river and the flesh rotted away.

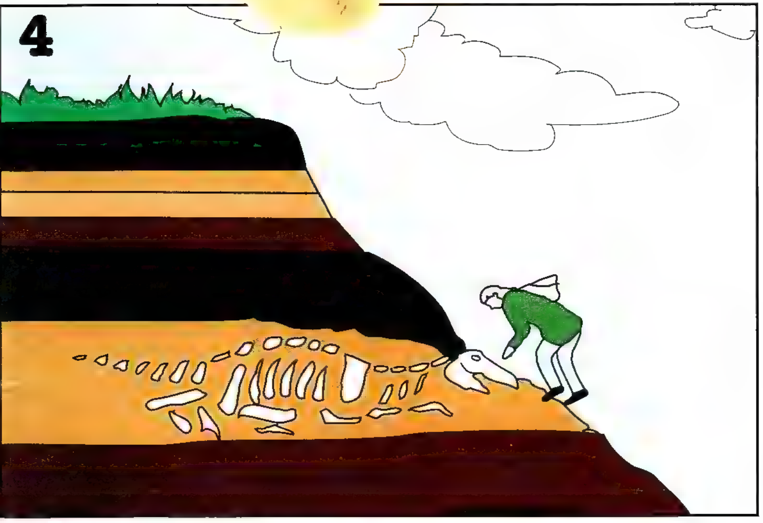
3 The skeleton was gradually buried under mud, and minerals from the water seeped into the bones and preserved them. Over millions of years, the mud turned into layers of rock and the dinosaur skeleton become a fossil.

THE FOSSIL DETECTIVES

The scientists who do all the detective work on fossils are called palaeontologists (pay-lee-on-toll-o-jists). They have found fossils all over the world. Their job can be very difficult because the fossil bones are often scattered in pieces. Only very rarely is a whole skeleton preserved in the rocks. Palaeontologists identify the fossil bones, remove them from the ground, put them together, like a jigsaw, and decide how old they are. You can see the results of their work in natural history museums where dinosaur fossils are mounted and put on display.



Still in the rock where it died millions of years ago: the fossil of *Compsognathus*, a little dinosaur the size of a chicken.

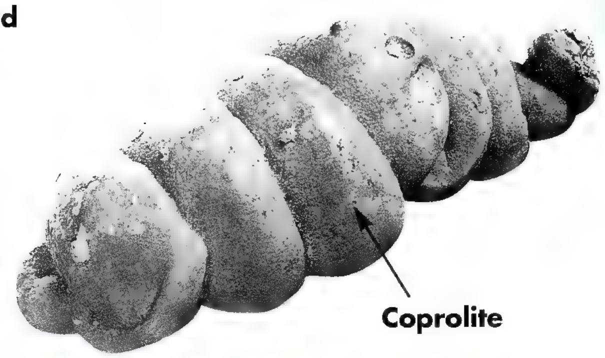


▲4 Millions of years later, the sea level dropped. The wind and rain wear away the rock revealing the fossil: proof that dinosaurs once lived.

Fossils like this footprint are called trace fossils, because they are not part of an actual animal.

DINOSAUR DROPPINGS

Fossil bones and teeth are not the only clues that these giants of the past left behind them. Dinosaur footprints and the imprint of scaly skin, made in soft mud millions of years ago have also been found. Some of the most remarkable fossils found are dinosaur droppings.



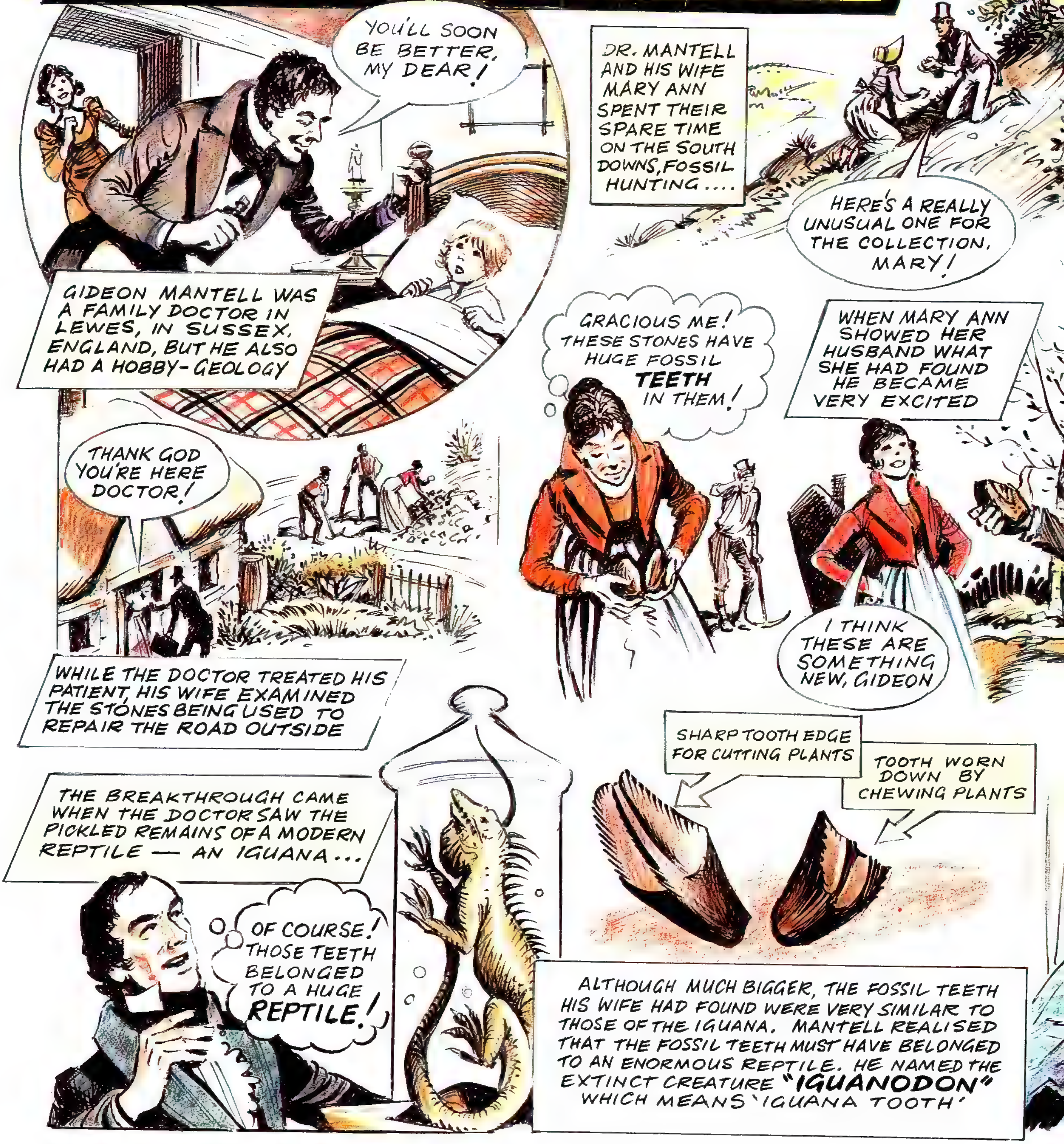
Scientists grind up dinosaur droppings, or coprolites, into fine dust to find out what dinosaurs ate.

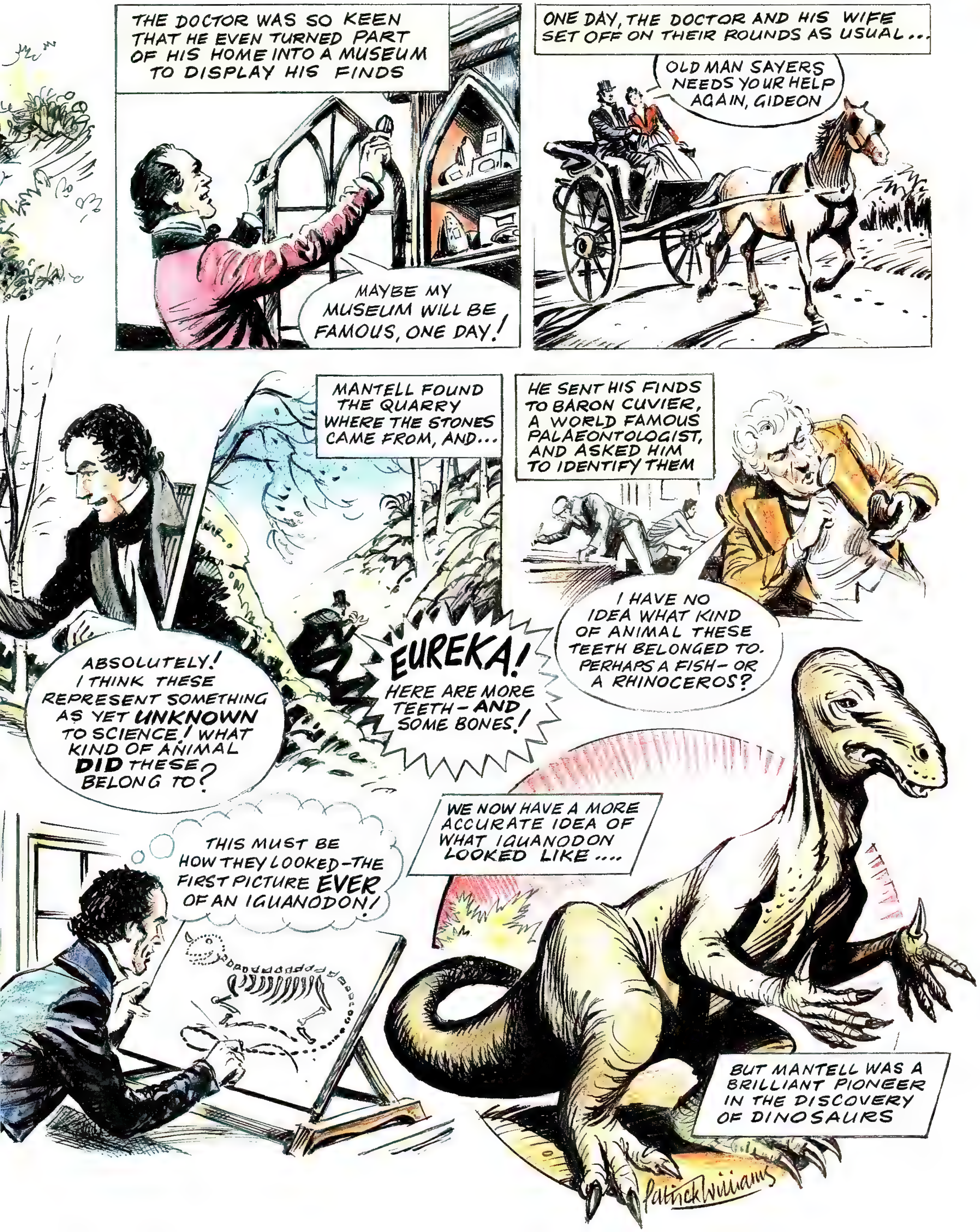
IT'S A FACT

WHAT'S IN A NAME ?

The word 'dinosaur' was first used in 1842. It was invented by Professor Richard Owen who studied British fossil reptiles. Owen realised that some of the large fossils belonged to a special group of animals that did not have a name. So he called them dinosaur which means 'terrible lizard'.

IGUANODON DISCOVERED


YOU'LL SOON BE BETTER, MY DEAR!
GIDEON MANTELL WAS A FAMILY DOCTOR IN LEWES, IN SUSSEX, ENGLAND, BUT HE ALSO HAD A HOBBY - GEOLOGY
DR. MANTELL AND HIS WIFE MARY ANN SPENT THEIR SPARE TIME ON THE SOUTH DOWNS, FOSSIL HUNTING ....
HERE'S A REALLY UNUSUAL ONE FOR THE COLLECTION, MARY!
THANK GOD YOU'RE HERE DOCTOR!
WHILE THE DOCTOR TREATED HIS PATIENT, HIS WIFE EXAMINED THE STONES BEING USED TO REPAIR THE ROAD OUTSIDE
GRACIOUS ME! THESE STONES HAVE HUGE FOSSIL TEETH IN THEM!
WHEN MARY ANN SHOWED HER HUSBAND WHAT SHE HAD FOUND HE BECAME VERY EXCITED
I THINK THESE ARE SOMETHING NEW, GIDEON
THE BREAKTHROUGH CAME WHEN THE DOCTOR SAW THE PICKLED REMAINS OF A MODERN REPTILE — AN IGUANA ...
OF COURSE! THOSE TEETH BELONGED TO A HUGE REPTILE!
SHARP TOOTH EDGE FOR CUTTING PLANTS
TOOTH WORN DOWN BY CHEWING PLANTS
ALTHOUGH MUCH BIGGER, THE FOSSIL TEETH HIS WIFE HAD FOUND WERE VERY SIMILAR TO THOSE OF THE IGUANA. MANTELL REALISED THAT THE FOSSIL TEETH MUST HAVE BELONGED TO AN ENORMOUS REPTILE. HE NAMED THE EXTINCT CREATURE "IGUANODON" WHICH MEANS 'IGUANA TOOTH'


THE DOCTOR WAS SO KEEN THAT HE EVEN TURNED PART OF HIS HOME INTO A MUSEUM TO DISPLAY HIS FINDS
MAYBE MY MUSEUM WILL BE FAMOUS, ONE DAY!
ONE DAY, THE DOCTOR AND HIS WIFE SET OFF ON THEIR ROUNDS AS USUAL...
OLD MAN SAYERS NEEDS YOUR HELP AGAIN, GIDEON
MANTELL FOUND THE QUARRY WHERE THE STONES CAME FROM, AND...
EUREKA! HERE ARE MORE TEETH – AND SOME BONES!
ABSOLUTELY! I THINK THESE REPRESENT SOMETHING AS YET UNKNOWN TO SCIENCE! WHAT KIND OF ANIMAL DID THESE BELONG TO?
HE SENT HIS FINDS TO BARON CUVIER, A WORLD FAMOUS PALAEONTOLOGIST, AND ASKED HIM TO IDENTIFY THEM
I HAVE NO IDEA WHAT KIND OF ANIMAL THESE TEETH BELONGED TO. PERHAPS A FISH – OR A RHINOCEROS?
THIS MUST BE HOW THEY LOOKED – THE FIRST PICTURE EVER OF AN IGUANODON!
WE NOW HAVE A MORE ACCURATE IDEA OF WHAT IGUANODON LOOKED LIKE....
BUT MANTELL WAS A BRILLIANT PIONEER IN THE DISCOVERY OF DINOSAURS
Patrick Williams

Improve and test your knowledge with...

DINO Fact File

Follow the footprints to complete the quiz and get to the bottom of the question!

1 What does *Tyrannosaurus rex* mean?
a) big foot
b) king of the tyrant reptiles
c) tyrant tooth

2 What did *Tyrannosaurus rex* eat?
a) vegetables
b) grass
c) meat

Recent discovery

Everything we know about dinosaurs has been discovered over the last 170 years. Before that, no one knew that such creatures existed.

What's in a name?

Avaceratops was named after the discoverer's wife, Ava. Ceratops means 'horned face'.

6 For how many years have humans existed?
a) 3 million years
b) 1,000 years
c) 1,990 years

7 How long did dinosaurs rule the Earth?
a) 100 years
b) 160 million years
c) 1million years

8 What were the first living things on Earth?
a) bacteria, and algae called blue-greens
b) dinosaurs
c) fish

9 What is a coprolite?
a) a flying reptile
b) someone who studies fossils
c) a dinosaur dropping

Missing fingers

No good fossil bones of the tail or fingers of Tyrannosaurus rex have been found so far. The two fingers with which T rex is usually shown are based on those of Albertosaurus because it was a similar dinosaur.

First evidence

The first dinosaur fossils ever to be found were discovered in England in the 1820s. The first American dinosaur fossils were found about 30 years later in the 1850s.

10 When was the word dinosaur first used?
a) 1776
b) 1842
c) 1990

3 **How did *Dicraeosaurus* defend itself?**
- a) with its whiplash tail
- b) with its teeth
- c) by charging at its attackers

4 **What did *Avaceratops* use its horn for?**
- a) digging in the ground
- b) chopping up plants
- c) protecting itself from meat-eaters

5 **Where did dinosaurs live?**
- a) on land
- b) in the sea
- c) in the air

Dinosaur National Monument

In Utah, USA, so many dinosaurs were found that a whole area was turned into a museum. Nearby is a town called Dinosaur with street names such as Triceratops Terrace, Stegosaurus Freeway and Brontosaurus Boulevard.

Oldest bite

Fossilized leaves with a bite taken out of them have been found. Teeth marks round the edge of the bite can be seen, showing what a dinosaur had for its dinner.

Short sprint

Tyrannosaurus rex could run about 30 km/h (kilometres per hour), although only in short bursts. It probably ran its fastest when chasing its prey. Human beings, when running flat out, can reach a top speed of about 25 km/h.

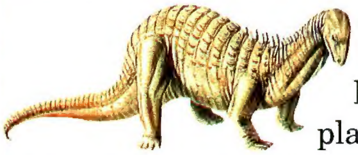
Answers to the questions on inside back cover

A

ABELISAURUS **80 MYA**

A skull of *Abelisaurus* (ah-bell-i-saw-rus) was found quite recently in Argentina. No bones have yet been found of this dinosaur, so experts don't know exactly what its body looked like or what size it was. But they do know that *Abelisaurus* was a meat-eater with powerful jaws and knife-like teeth.

ACANTHOPHOLIS **95 MYA**



Acanthopholis (a-kan-tho-fole-is) had a tough, armour-plated body, which protected it against fierce enemies, such as *Tyrannosaurus*. It was as big as a car, growing up to 4m long. *Acanthopholis* was a plant-eater. Its fossils are very rare, but some have been found in Folkestone and Cambridge in England.

ALBERTOSAURUS **75 MYA**

Albertosaurus (al-bert-oh-saw-rus) means 'reptile from Alberta'. It was named after the area in Canada in which its bones were first found in 1884. *Albertosaurus* measured 9m long, which is about the same length as a double decker bus. This huge meat-eating dinosaur had even more teeth than the ferocious *Tyrannosaurus rex*. Once *Albertosaurus* had caught its prey, it would kill it with a bone-crushing bite.

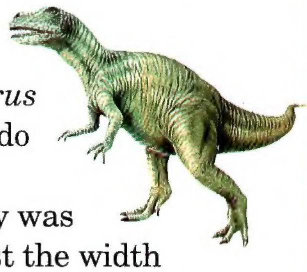
ALECTROSAURUS **80 MYA**

The name of this dinosaur means 'unmarried reptile', because its skeletons have always been found alone. It lived in places such as Mongolia in Asia. *Alectrosaurus* (a-lec-tro-saw-rus) was a meat-eater. It was related to *T rex*, but was much smaller.

ALIORAMUS **70 MYA**

Alioramus (a-li-oh-ram-us) was similar to *Alectrosaurus*. It too was related to *T rex*. It lived in Mongolia, Asia. *Alioramus* was 6m long and had a low, flattish head.

ALLOSAURUS **150 MYA**



Allosaurus (al-oh-saw-rus) means 'strange reptile'. *Allosaurus* was first found in Colorado in the United States of America in 1869. Its body was 12m long, which is almost the width of a tennis court. It was a fierce meat-eater and each hand and foot had three strong claws to grip its victims.

ALTISPINAX **130 MYA**

Altispinax (al-ti-spy-nax), meaning 'high thorn', had spectacular spines on its back. Together, they looked like the sail on a ship and may have been used to threaten rivals. However, the spines were not very strong and could be easily damaged in a fight. *Altispinax* was 8m long, about the length of two cars. It lived in northern Europe.

MYA = MILLION YEARS AGO

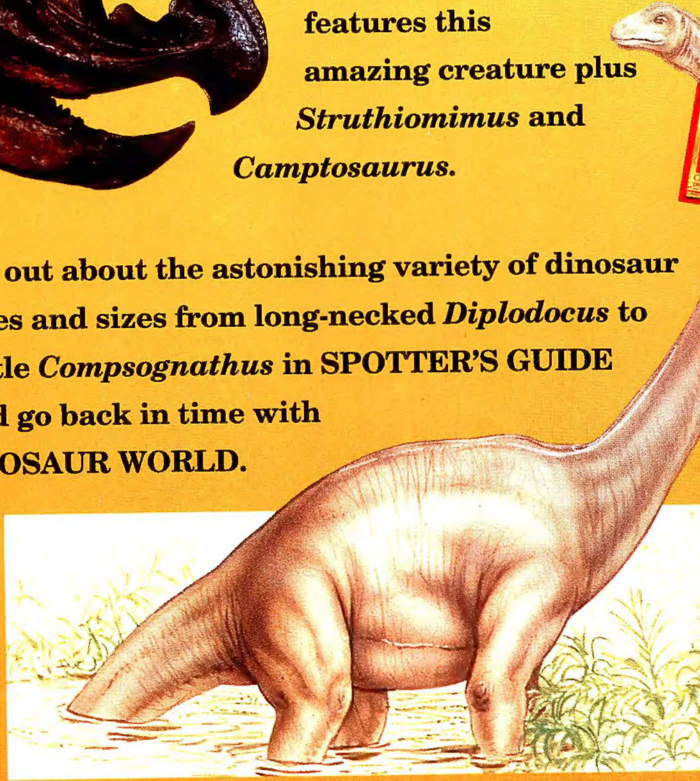
COMING IN PART 2 OF

DINOSAURS!

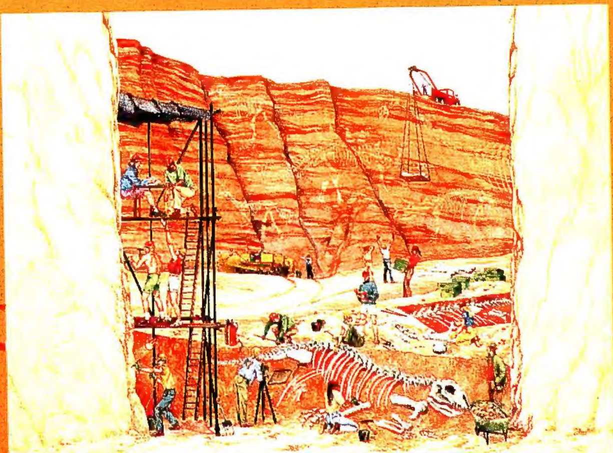
DINOSAURS!
DISCOVER THE GIANTS OF THE PREHISTORIC WORLD
2
ORBIS

The great horns of *Triceratops* made it the rhinoceros of the dinosaur world. IDENTIKIT features this amazing creature plus *Struthiomimus* and *Camptosaurus*.

Find out about the astonishing variety of dinosaur shapes and sizes from long-necked *Diplodocus* to little *Compsognathus* in SPOTTER'S GUIDE and go back in time with DINOSAUR WORLD.



Join a dig and discover a dinosaur in TIME DETECTIVE.



PLUS

More incredible 3-D dinosaurs to view with your special glasses

GIANTS OF THE PAST brings the world of dinosaurs to life as *Triceratops* go into action

Through HISTORY IN PICTURES find out why 20 Victorians had dinner in a dinosaur

AND

A-Z
ASK THE EXPERT
DINO FACT FILE
with more facts, and questions to test your knowledge

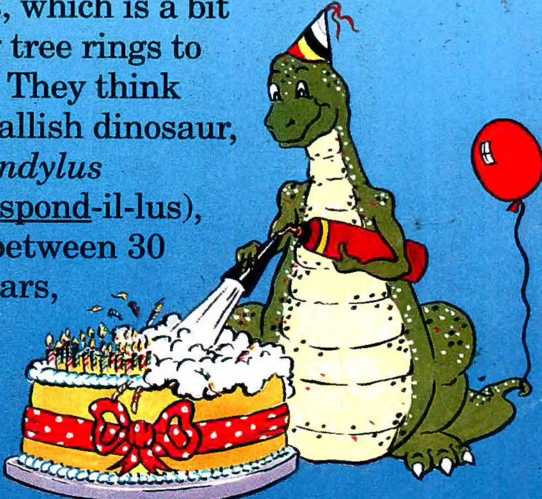
ANSWERS TO DINO FACT FILE QUESTIONS: 1.b 2.c 3.a 4.c 5.a 6.a 7.b 8.a 9.c 10.b

Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

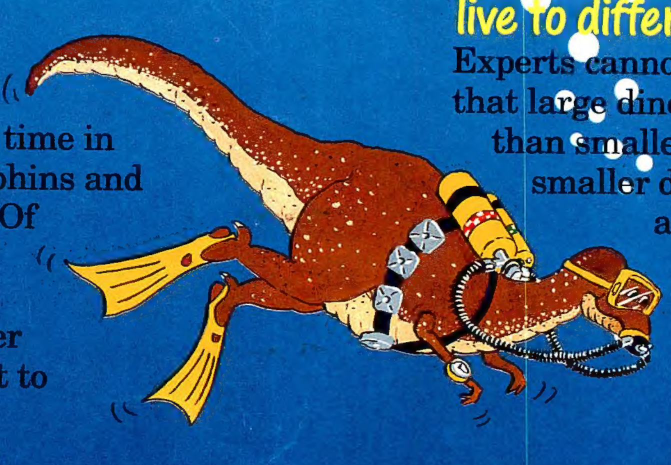
How long did a dinosaur live?

It is almost impossible to work out exactly how old individual dinosaurs were when they died. However, scientists are trying to find out the rate of bone growth in dinosaurs, which is a bit like using tree rings to age trees. They think that a smallish dinosaur, *Massospondylus* (mass-oh-spond-il-lus), lived for between 30 and 70 years, much the same as a human being.



Did dinosaurs live in the sea?

Dinosaurs did not live in the sea all the time in the way that dolphins and whales do today. Of course, they may have waded into shallow water or even swum out to sea for short distances, just as horses can. But none lived in the sea all the time, so creatures such as plesiosaurs, which lived in water, were not dinosaurs.



Which was the biggest dinosaur?

Seismosaurus (size-mo-saw-rus) may have been the biggest dinosaur that ever lived. Part of its skeleton is still being dug out from the ground in the USA. This monster may have been 36.5m long, which is as long as one and a half tennis courts. It probably weighed about 51 tonnes, so it was heavier than nine African elephants.

Did different sized dinosaurs live to different ages?

Experts cannot be certain but they think that large dinosaurs probably lived longer than smaller ones. This is because smaller dinosaurs grew up quicker and lived life at a faster rate.

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